2002

Identifying Educational Technology Leadership Competencies For New Jersey's School Superintendents

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IDENTIFYING EDUCATIONAL TECHNOLOGY LEADERSHIP COMPETENCIES FOR NEW JERSEY'S SCHOOL SUPERINTENDENTS

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Submitted in Partial Fulfillment of the
Requirements of the Degree of Doctor of Education

2002

ABSTRACT

IDENTIFYING EDUCATIONAL TECHNOLOGY LEADERSHIP COMPETENCIES FOR NEW JERSEY'S SCHOOL SUPERINTENDENTS

Educational technology continues to place increased demands on district superintendents. Research indicates most districts originally infused educational technology into schools at lightning speed before establishing desired student outcomes or preparing teachers with effective professional development. The massive financial investment for educational technology has created new concerns and tensions for practicing superintendents in their leadership role. Current research demonstrates performance indicators districts can follow for Technology Literate Students - the Technology Foundation Standards that are part of the National Educational Technology Standards (NETS), an initiative by the International Society for Technology in Education (ISTE). These same two groups, NETS and ISTE, also developed Technology Standards for Teachers' outcomes and expectations in their NETS–T (Teachers) Performance Indicators for districts to follow. Thus, now is the time to focus on the practicing superintendents who are supposed to effectively oversee these massive financial investments. The Technology Standards for School Administrators Collaborative was gathering input from all administrators on a national level for their emerging Technology Standards for School Administrators (TSSA) at the same time this research was conducted. However currently there is still little research from the perspective of practicing superintendents' on their districts' technology implementation. This investigative study used the

aforementioned theory (ISTE, NETS, NETS-T, TSSA) to create an original survey instrument that collected the perceptions of New Jersey's K-12 superintendents in their role as the educational technology leader. The superintendents' perceptions on technology's influence on the culture of learning and teaching, along with their tenets on staff development, planning, vision and support, both technical and professional, were examined in this study. This research indicates that superintendents' personal practice and use of technology, that is the superintendents' modeling of technology, as the conduit for information and communication, have a statistically significant influence on their districts' implementation of technology. The study also analyzed the influence of the districts' socio economic status, DFG, the superintendents' self-reported efficacy level in the use of technology along with superintendents' technology learning methods on the districts' technology implementation.
(Keywords: educational technology, superintendent, modeling, self-reported efficacy, learning methods)

Acknowledgements

At the culmination of this undertaking I cannot help but reflect and ask myself what values began this dream and helped me bring it to fruition. Therefore, to my parents, Fae and Sal Viscuso, my first teachers and role models who taught me how to live, learn and love through their unending support and value system – thank you. I dedicate this work to you both along with my husband, Jim, who has continuously brought new dimensions to my life. And without whose constant nurturing and love, this research would ever have been completed. Also, to my children, Cara and Ron, to their spouses Tom and Lori and my grandchildren, Alexis, Ryan and Mia, thank you for your support and understanding as to why I was always "busy".

What a journey these past two years have been. To my educational family at Middle Township, I thank you for your support and understanding. To my new educational family at Seton Hall University, thank you for the most exhilarating academic experience of my life. I would like to especially acknowledge my mentor, Dr. John Collins, whose guidance, leadership, expertise and kind assistance through this meaningful process truly brought the closure I so desperately desired. Thank you and thank you again! To the members of my committee: Dr. George Lindemer and Dr. Angela Davenport, thank you for your time and willingness to assist me through this journey. And to my two special new friends in Cohort IV, Florence Pisano and Karen Rezach, who encouraged and solidified this quest for excellence, thank you for providing the unique collegiality needed to complete this awesome task!

This Seton Hall experience has truly brought me new understanding of St. Catherine of Siena's words "Nothing great is ever achieved without much endurance."

Acknowledgements

A special thank you to the following experts in the field of educational technology whose works were not only instrumental in triggering this area of curiosity for my research study, but who were also willing to graciously assist me. A special thank you to Alan November for his time, comments and conversations throughout this investigative study. Thank you to Ian Jukes and Dr. Jason Ohler, for their comments and insight in the development of the survey instrument. And to David Warlick, thank you for your initial response to my research study.

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CHAPTER I

INTRODUCTION

Background of the Problem

School district superintendents have been thrust into the complex role of technology leadership. This role requires a new form of leadership and diverse technical skills to provide guidance to Boards of Education, other administrators, and teachers who are all involved in the purchase and implementation of technology. The newness and dynamics of this role makes it virtually impossible for superintendents to already possess the necessary expertise in all aspects of the technology leader's position (Anderson & Dexter, 2000; Jukes & McCain, 2001; Forum 1997a). What are the crucial competencies superintendents need to fulfill their role as technology leaders and to ensure their districts' technology initiatives benefit teaching and learning? A review of the literature reveals rubrics for superintendents to self-assess their technology skills (Bartleson & Johnson, 1999; North Central Regional Education Laboratory (NCREL), 2000; TSSA, 2001 et al), and formats to follow for technology planning (NCREL, 2000; New Jersey Department of Education [NJDOE], 2001), yet there is little research from the perspective of a practicing superintendent. Furthermore, "experts say there is a link between administrators' ability to make informed technology decisions and their personal use of technology" (Trotter, 1997, p. 2). And there has been very little attention given to the formal preparation of the superintendent as a technology leader.

There has been such an urgency to get hardware infrastructures in public schools, there has been no time to actually prepare the teachers (Forum, 1999; Branigan, 2000; Educational Research Service, 2001; Jukes & McCain , 2001; Cuban 2001) no less the educational leaders for this massive costly undertaking. However, during the past four years there has been growing concern in public education as to just what impact technology has had on student learning and achievement (Conte, 1997; Valdez et al, 1997; Star Chart, 2001; Becker & Anderson, 1998; Johnson, 1998; Association for Supervision & Curriculum Development [ASCD], 1999; Forum, 2001; Cuban 2001). Just as teachers need to know how to operate technology and integrate it into the educational process for positive results, so do superintendents need to develop technical, instructional and leadership expertise in educational technology in order to use it effectively, creatively, and wisely in their districts.

Statement of the Problem

Our public schools' key mission is to prepare students for our ever-changing global society. And new technologies have made a significant impact in our society. Consequently in this recent decade our public schools have been trying to infuse these technologies into their curriculum (Forum, 1997b, 2000, 2001; Spillane, 1998; Robelen; 1999; Kleiman, 2000; Penuel & Means, 1999). During the 20th century the focus of educational technology was centered on print media; that is, to communicate ideas, access information or learn about the world, the basic tools were paper, pens, books and chalk. As we approached the 21st century a transformation from print media to electronic media emerged. The basic tools became word processing, email, fax-modems, video, CD-ROMS, multimedia and the Internet (Picciano, 1998). As Picciano explains "In sum,

technology is becoming the tool of choice for communicating in, accessing, and learning about our world." (p. 4). According to the U.S. Department of Education [USDOE] (2000, 2001), and Education Week (2001) over 90 percent of schools have access to the Internet and more than half of U.S. schools provide at least 90 percent of their teachers with an email account.

The literature indicates that educators must have a clear-eyed commitment to using technology to help meet central educational goals and well developed plans for achieving them in order to get a substantial return on district investments (Consortium for School Networking [CoSn], 2001; Cuban, 1984, 2001; Dubenezic, 1997; Jukes & McCain, 2001; NCREL, 2000; Robelen, 1999; USDOE, 2000). Furthermore, by using technology effectively for school improvement (Donovan, 1999), all the nation's students should be able to achieve higher academic standards and be equipped with the skills needed to become contributing citizens and productive workers in the 21st century (Forum, 1997a). What is the role of the administrator as the critical and costly issue of school computer utilization shifts from mere access to the more fundamental issue of how to effectively integrate technology into the curriculum? Communities throughout our country are requiring school leaders to become more insightful and forward thinking. The expectations and demands for administrators include new skills for them to implement technology effectively in their schools and communities in order to contribute greatly to both education and the economy in the twenty-first century.

In our nation, forty-five states have in place or are creating state standards in the area of technology. According to the Milken Exchange on Education and Technology (1999), nine of these states even require a technology-related exit exam for high school

graduation. At the same time, there are initiatives for mandates on teachers' competency in the realm of technology. In fact, North Carolina and Idaho require teachers to demonstrate technology competence for certification and licensure. Furthermore, the Roanoke City Public Schools in Virginia established guidelines for employee technology skills. By the fall of 1995 entry-level administrators had to be able to do seventeen specific technology skills and at the same time the current administrators were given until fall of 1998 to perform the entry level plus an expansion including personal and professional practice and leadership traits (Virginia DOE, 2000).

In 1999, propelled by federal, state, and local initiatives, schools spent an estimated 6.9 billion dollars on desktop computers, servers, routers, wiring, Internet access, software and everything else involved in making modern technology available. Rockman (1998) stated that between 1991 and 1997 19.6 billion dollars was spent on instructional technology in United States public schools. Thus, administrators have become acutely aware of the burgeoning expense associated with providing access to computers and the Internet. As evidenced in these statistics, in this recent decade our public schools have been infusing these new technologies into their schools and curriculum at tremendous speed.

In fact, the Fiscal Year 2002 budget proposal that President G.W. Bush sent to Congress on April 9, 2001 consolidated nine education technology programs into a single block grant funded at 817 million dollars, which although down from 872 million dollars in 2001, still indicates a huge financial investment for technology in our nation (USDOE, 2001). This recent massive technology infusion is clearly demonstrated by the statistics presented by the National Center for Education Statistics (USDOE, 1997): by the fall of

2000, 98 percent of all public schools in the United States had access to the Internet as compared to 35 percent in 1994. The ratio of students to instructional computers in public schools by the fall of 2000 had decreased to 5 to 1, a ratio that "many experts consider ... a reasonable level for the effective use of computers within the schools" (USDOE, 2001, p.14).

The New Jersey Department of Education, Office of Educational Technology provided the following statistics from their School Technology Survey 2000. The survey had an 82 percent response rate. Within this 82 percent, 98 percent of the schools reported Internet connectivity, and the ratio of students to multi-media computers was reported at 5.3 to 1, down from 7.1 to 1 in 1999. However, in comparing the New Jersey ratio of students to all computers, not just multi media, the statistics indicate 4.6 to 1 for 2000, versus 5.4 to 1 in 1999, which is slightly better than the national ratio of 5 to 1. This further indicates the increase in technology financial investments by New Jersey's school districts. Furthermore, New Jersey's Department of Education envisions "all students, no matter which district they attend, will be able to achieve the Core Curriculum Content Standards because they will have unlimited access to people, to the vast array of curriculum and instruction offered in the state, and, in particular, to information and ideas, no matter where they exist." (New Jersey Department of Education, [NJDOE], 2001b). To implement this vision the Office of Technology states:

> The New Jersey Department of Education and New Jersey's school districts are moving forward vigorously to infuse educational technology in curriculum and the Content Standards. The purpose is to accelerate the delivery of voice, video, and data so that all districts will have the opportunity to share curricular offerings,

ongoing projects management of information for student achievement of the Core Curriculum and programs, and professional development opportunities. This delivery will expand the scope, quality, richness and diversity of curricula in all school districts and contribute to the redefining of teaching and learning in our state.

In order to achieve this vision by 2002, the state has provided the following to guide district and school technology plans.

Benchmarks for New Jersey Schools:

1. Educational technology will be fully infused into the schools' curriculum and instruction, thus significantly enhancing students' ability to achieve the Core Curriculum Content Standards. For example, computers will be integrated into all classrooms for instructional purposes, rather than maintained solely in a computer laboratory environment.
2. All counties will continue to implement and update plans for the coordination, development, application and implementation of technology through countywide collaboration and commitment using existing and new educational, business, and community resources.
3. All local school districts will continue to implement and update biennially their local technology plans to address core elements of successful school technology activities, including facilities planning, maintenance and upgrading equipment, implementation strategies, staff development, spending and evaluation plans.
4. All teachers will have the skills and knowledge needed to use educational

technology as an effective tool to support achievement of the Core Curriculum Content Standards. The state's system of Educational Technology Training Centers will continue to offer the highest quality professional development opportunities for educators in cooperation with additional local preservice and inservice training.

5. All classrooms will have fast and reliable Internet access, thus enabling educators and students to access information, places and people throughout the world to enhance achievement of the Core Curriculum Content Standards.
6. All school districts will have high quality, highly informative, user-friendly websites, thus enabling educators and students to share key information about their district's activities in a timely manner and showcase their achievements.
7. All districts, schools and classrooms will be connected to high-speed voice, video and data networks, thus enabling effective and efficient delivery of resources to educators and students through a statewide, integrated information delivery system.
8. All school buildings will have the equipment and infrastructure necessary to provide distance-learning opportunities for all students, thus enabling students to take courses offered in other schools or universities, to collaborate on projects with remote peers or mentors, and to access a wide array of electronic services for achievement of the Core Curriculum Content Standards.
9. The multiple distance learning networks throughout the state will be connected and will, therefore, be able to communicate with each other freely, thus enabling students and teachers to access courses and share projects

no matter where they are located.

10. The ratio of multi-media computers to students will be 1 to 5, thus enabling students to access equipment when they need it, where they need it.
11. All teachers will have e-mail, thus enabling them to freely communicate with their colleagues throughout the world, and with parents and students in there communities to enhance achievement of the Core Curriculum Content Standards.
12. All educators and students will have access to effective and engaging software, CD ROMs, and online resources as an integral part of every school curriculum, thus enabling them to access a vast array of materials in support of achievement of the Core Curriculum Content Standards.
13. All school districts will have the equipment necessary to access satellite transmissions, thus enabling them to capture special events that are uniquely broadcast via satellite.
14. All school construction projects (new and retrofitting) will include a backbone distribution system, communications outlets in each room, and wiring closets in each school thus enabling schools to establish infrastructure for a technology-rich environment.
15. Schools will have educational technology coordinators in the following ratios: one for each high school, one for each middle school and one for each three elementary schools. This will enable educators to have onsite experts to facilitate implementation of technology equipment and programs (NJDOE, 2001b).

Purpose of this Study

Realizing that technology is ever changing, the state has declared these benchmarks to be a work in progress. It is therefore logical to ask the following questions. How will a superintendent know the most effective way to infuse educational technology into the schools' curriculum and instruction, benchmark 1? What competencies do superintendents need in the implementation and update of the technology plan to ensure it becomes a collaborative document, benchmark 2? How will a superintendent ensure the technology plans address core elements of successful school technology activities, benchmark 3? Furthermore, how does the self-reported technology efficacy level of a superintendent influence a district's goal to ensure all teachers have the skills and knowledge needed to use educational technology as an effective tool to support achievement of the Core Curriculum Content Standards, benchmark 4? Thus the persistent overarching question is how a superintendent can effectively lead to accomplish these necessary benchmarks and effectively use the technologies that are usurping so much of the district's resources.

Current literature demonstrates the extraordinary amounts of funds spent on new technology in our public schools, and the emerging research base questioning the expenditures and their impact on student learning. The newness and dynamics of technology is presenting an overwhelming challenge for today's instructional leaders and administrators. While there are systemic efforts to infuse instructional technology, attention must also be directed to prepare administrators, teachers and counselors (ASCD, 1999; Bennett, 1996: Borba & Ligon, 2000; Hall & Hord, 2001; Bozeman & Hiatt, 1999; Consortium of National Educational Technology Standards [CNETS] & International

Society of Technology Education [ISTE], 2000; Roden, 1997) on how to effectively use these technologies.

Schools that have been successful confronting societal demands share one characteristic (Houston, 2001). Each school has a leader that is strong, capable and passionate. Thus the next set of logical questions must be asked. What are the competencies of the capable leaders and where and how were they acquired? Are the superintendents prepared to make decisions for technology spending and implementation? And do they have the competencies to support the instructional staff in the realm of technology? If the answers to these questions were known there could be a rigorous leadership curriculum to follow for institutions of higher learning. The most effective learning methods could be implemented and future superintendents would become more proficient in the realm of technology.

This investigative study examined how superintendents as technology leaders rate their training, technological knowledge, competency levels and overall perceptions of the impact of technology on their learning community; that is in general, their technology implementation skills. The following questions will be examined.

Research Questions

1. Does the DFG of a school district significantly impact the perceptions of the superintendent toward technology implementation?

2. Does the superintendent's technology practice significantly impact the implementation of technology in his/her school district?

3. Does the superintendent's technology learning method significantly impact the implementation of technology in his/her school district?

4. Does the superintendent's self-reported level of technology efficacy significantly impact the implementation of technology in his/her school district?

Search Process

In order to establish a basis for this study, the following search criteria were used:

National and state statistical analysis of technology expenditures

Abstracts, texts, and articles on the role of technology, and leadership in effective schools

The Internet, including appropriate Web sites on Leadership, Technology, Teaching and Learning, Assessment and Accountability

Reports from respected technology organizations, public (non profit) and private (for profit)

The Importance of the Superintendent's Role as the District Technology Leader

Public schools, along with the rest of society, at the turn of the century have been permeated with technology. Businesses are already demanding graduates who are technologically literate and communities throughout the country are increasingly requiring effective leadership in the area of technology. Technology's burgeoning expenditures have triggered a new requirement for school district superintendents to ensure the resources are being used effectively (Kearsely & Lynch, 1992; Kelley, 1999). Recently, the integration of technology in classrooms has been demonstrated to have a positive impact on student achievement (Valdez et al., 1999). However, to gain this benefit, according to the literature, districts must couple technology with ongoing staff training (Levin-Epstein, 2000; Murphy & Gunter, 1997; NCREL, 2000, Norris & Smolka & Soloway, 1999; Scheffler & Logan, 1999). Administrators must provide the support, time and other resources teachers so desperately need to effectively embrace

technological reforms in their classrooms which will in turn promote learning (Andero, 2000; Bjork, 1993; Cooley & Johnston, 2000; Coppola, 2000; Slowinski, 2000; Jones, 2001). At the same time, there is a current movement towards standards and accountability on a national, state and local level. This puts additional pressure on superintendents to reflect on how to best promote the integration of information technologies in their district. The caveat is that technology is not an end in itself but rather must be used to promote innovation toward school improvement and student learning (Franklin, 2001)

Administrators must have the skills and competencies to collaborate with all key stakeholders to determine how technology can be used to enhance teaching and learning. They must be prepared for a significant investment in all their resources to move technology from a part-time tool to an active transparent tool fully integrated into the curriculum. For an innovation to move to full integration, Donovan (1999) suggests the reform should embrace many of the following characteristics: 1. be advantageous to current methods, 2. be compatible with needs and expectations, 3. be simple to use, 4. be easily tried without a huge commitment to change and 5. be observable and modeled by staff who embrace technology. Depicting the instructional technology field as a quicksilver environment with constant and dramatic change further emphasizes the importance of the administrative support and expertise needed to implement this ongoing change process (Fullan, 1997). The persistent and logical question is just what competencies are needed and how are they acquired by the superintendent to implement meaningful reform. Furthermore, when the technology is being infused into the classroom, the next logical question to ask is there enough on-site technical support

provided by the district? Forum's (1997) report, "From Pillars to Progress" indicates that the lack of this support may discourage teachers from using technology to its fullest potential.

Definition of Terms

The following terms are used in this investigative study. These terms represent specific information and have specific meaning to the study, therefore, they are defined to facilitate the reader's understanding.

District Factor Group: A relative indicator of the socioeconomic status of the citizens who reside in a school district, based on information from the U.S. Bureau of the Census. (NJDOE, 2001).

Competencies, skills, abilities and knowledge: The international education consultant, John Raven, posits these terms have been used in harmony with the definition of competency. Thus these terms have been used interchangeably throughout the study. The word "competency" is used to encompass a motivated pattern of knowledge, skills and abilities deployed to undertake a valued activity. Because values and motivation are so important it is not possible to substitute "knowledge", "skills", or "attitudes" on their own for this word. (Raven, 1984, p. 401 in Ford, 2000)

Change: A mandatory process that includes the personal, organizational and cultural areas of a district and is often characterized by conflict (Hargreaves, 1997).

Curriculum: The basic learning content for all students which is complemented by technology, that is curriculum that addresses how, not what, children learn and how new technologies can assist in this effort (Costa & Liebmann, 1997).

Public School District K-12: In New Jersey there are 232 K-12 school districts, each led

by its own Superintendent (NJDOE, 2001d).

Stages of Technology Competence:

The Novice is a person at the survival stage.

The User (or Apprentice) is a person at the mastery stage.

The Integrator (or Proficient) is a person at the impact stage.

The Facilitator (or Expert) is a person at the innovation stage (Virginia Department of Education, 2000).

The Novice: A person who struggles against technology of any kind, has little familiarity with equipment, is just developing basic technology skills and has unrealistic expectations, and envisions the classroom as teacher-directed.

The Integrator: A person who is less threatened by technology, focusing on its use for student learning, a content and cross-curricular teaching tool, and envisions a learner centered classroom.

The User: A person who focuses on personal development, increased technical competence, is more engaged with technology, discovers new forms of interaction and is confident with new classroom structure.

The Facilitator: A person who becomes a facilitator of learning and restructures the curriculum and learning activities while assisting others to become users of technology instruction.

Superintendent: The educational head of a district certified by the State of New Jersey Department of Education with a Standard School Administrator License (NJDOE, 2001d).

Teaching and Learning: A process in which technology provides synchronous and

asynchronous tools for effective learning and allows true individualized instruction and development. Technology is used as a mode of understanding, an empowerment tool, a subject and an aide.

Technology Implementation and Integration for Administrators: A concept encompassing three stages: Recognition, Evaluation and Implementation.

Technology Leader: A person at the school or district level who works as a leader in instructional uses of computers and other information technology (Moursund, 1985).

Technology Leader: A person who knows where to find information and/or how to get help for his/her staff; who demonstrates his/her willingness to learn technology expected of the staff and realizes communication and respect are critical.

Technology Planning: A systematic iterative process that considers all aspects of a district's mission (structural, hardware, personnel, support, constraints) and is driven by pedagogy with community, business, educational and consultant inputs.

Technology Support: A commitment by the district that matches the technical vision and compensates personnel in order to hire and keep them to ensure an ongoing quality technology program (Moertsch, 1998).

Self-directed Learning: The learner controls both the objectives and the means of learning (Mocker & Spear, 1982).

Formal Learning: The learning method in which the learner has little control over the objectives and means of learning (Mocker & Spear, 1982).

Computer Literacy: The basic skill indicating technical proficiency in computer use (International Society for Technology in Education [ISTE], 1998)

Information Literacy: The basic skill indicating proficiency in validating or evaluating

Internet information, that is the grammar of the Internet (November, 2001).

Communications Literacy: The basic skill indicating what you do with information, the ability to learn over the Internet and to work with people all over the world to establish new relationships (November, 2001).

Limitations

The participants used in this study were limited to the K-12 school districts in the state of New Jersey.

Survey research was undertaken. The questionnaire that was devised by the reseacher was used to measure and analyze the perceptions and influence level of the superintendent on technology implementation in his/her district. The list of school districts and superintendent names were obtained with the help of the State of New Jersey, Department of Education.

The data received from the questionnaire was coded and collated for analysis. All the data including the open-ended question was examined from the point of view of honesty and categorized by the researcher. The measures of comments concerning professional practice, technology assessment and evaluation, technology planning and vision, technology support and maintenance are limited to the participant's honesty, self-perception, and knowledge of basic technology leadership principles.

The procedures used in this study include a mailing of a cover letter, survey, and stamped return envelope replicated to the 232 New Jersey superintendents. The data were collected and utilized solely by the researcher. The results of this investigative study were strictly limited to the respondents of the survey instrument. Therefore, those superintendents who chose not to participate will not and cannot be tabulated.

Hypotheses

The hypotheses developed for this study are based on the purposes and the set of questions presented for research and analysis.

Hypothesis 1

The DFG of a school district has a direct impact on the perceptions of the superintendent toward technology implementation.

Hypothesis 2

The technology practice of the superintendent has a direct impact on the implementation of technology in his/her school district.

Hypothesis 3

The technology learning method of a superintendent has a direct impact on the implementation of technology in his/her school district.

Hypothesis 4

The self-reported level of technology efficacy by the superintendent has a direct impact on the implementation of technology in his/her school district.

Organization of the Study

This study is divided into discrete but interconnected modules to ensure the reader's logical and thoughtful journey. Chapter One, the first module, described the need for the study, a discussion of the problems related to this topic, the methods of addressing the problems, the research questions, the study's limitations and its overall benefit to the educational community and society. Chapter Two, the second module, centers around a review of the previous literature on this topic. It describes and unfolds the historical aspects of technology and its infusion into America's public educational systems. More

specifically, it highlights the initial financial commitments, expectations, preparations and accountability associated with technology. Chapter Three will describe and explore the methods used for obtaining the data, the subjects, survey instrument and procedures. Chapter Four will relate the analysis of the data to reach meaningful conclusions. Chapter Five will convey the conclusions, recommendations and implications for future research.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction and Overview

The review of the literature is divided into three parts. This first part provides an overview of the current review of the literature on technology integration in our public schools. The second, Technology – Teaching and Learning, will present the body of literature depicting technology integration as a way to reshape teaching and learning for all students in this third millennium. The last part, The Leadership Role of the Superintendent, will present a review of the literature on the role of the district superintendent as the technology leader.

Much of the educational literature from 1986 – 1996 expressed concern regarding the relevancy of what our education system was able to provide with or without technology (Handler & Schrum, 1997; Kaufman, 1997; McKeon, Dianda, & McLaren, 2001; Petersen, 1999; Russell, 2000, Scherer, 1999; Sergiovanni, 1996). The report for the U.S. Department of Education (1987) indicated that technology might be the factor to help bridge any ever-widening gap between schools and society. In fact, the impact of technology on the educational arena was just beginning. One review of the literature indicates that those who often foster the use of technology are guilty of following this hubris: "We start from a premise that the value of the new approach we urge is self-evident, and that teachers should naturally want to shift their ways radically to take

advantage of the new. Furthermore, impatience is another characteristic of those interested in seeking transformation of the educational system through technology." (Kerr, cited in Wellburn, 1996).

> For over two decades, educational technology has been used to varying degrees in our nation's schools. Numerous studies exist demonstrating that (a) educational technology appropriately applied can enhance learning and achievement compared to traditional teaching methods and (b) the benefits of educational technology cannot be adequately separated from other variables that impact learning in the larger instructional context. In spite of these findings, however, many schools systems are being asked to justify the use of computer-based technologies to enhance learning in school settings. (USDOE, 2001c)

National statistics clearly indicate how the nation's K-12 schools have made major gains in the implementation of new technologies. An average of $123.27 per student (63 percent for hardware, 20 percent for software, and 17 percent for staff development) was spent in the1999-2000 school year in our nation's K-12 public schools. The federal government contributed an estimated 35 percent to the nation's schools' technology budgets. (USDOE, 2001a). The 1999-2000 national student-to-computer ratio is 4.9 compared to 9.1 in 1995 with 98 percent of all schools placing computers in the classrooms. The student-to-multimedia computer ratio improved from 21.2 students per multimedia computer in 1997 to 7.9 students in 2000. This increase in multimedia computers is the necessary requirement for changes in curriculum presentation and delivery. As the literature indicates, schools are beginning to rely on the Internet and local networks for multimedia curricular content to improve teaching and learning. For

the 2000 academic school year, 13 percent of the nation's schools subscribed to online curriculum for their students.

In 1998, 85 percent of the nation's schools had Internet access in the classrooms compared to 94 percent in 2000. However, high minority/high poverty schools still lag behind as indicated by the following statistics. Schools with more than 50 percent of students qualifying for free lunch provide less access to computers – 5.3 students per computer compared to 3.3 for schools with out any children who qualify for free lunch. Schools with more than 50 percent minority enrollments average 9.4 students per multimedia computer compared to 6.9 students per multimedia computer for schools with fewer than 5 percent minority enrollments. Eighteen percent of high minority enrollment schools report that the majority of their teachers use the Internet for instructional purposes compared to 32 percent of low minority schools. Furthermore, schools with 50 percent or more minority enrollments average 10.5 students per Internet-connected computer compared to 6.4 students for schools with fewer than 5 percent minority enrollments (USDOE, 2001a).

The Education Week, 2001 report indicates the following statistics for teacher usage, skill levels and training. Teacher skill levels have improved based on a scale of beginner, intermediate and advanced. However, only 8 percent of the schools reporting indicated that the majority of their teachers are at an advanced skill level and were able to integrate technology use in the curriculum. More than 45 percent of the schools reported that over 50 percent of their teachers are at the intermediate skill level, which indicates they are able to use a variety of computer applications but not adept at integrating technology into the curriculum. On the average, schools in this report indicated 19 hours of technology-

related professional development, while 30 percent of the schools offered between one and nine hours per year, and ten percent of the schools offered 50 hours or more of technology-related professional development (USDOE, 2001).

Technology – Teaching and Learning

Do you want technology in the schools?

My child needs to be prepared for the 21st century? The Parents

When students have access to technology, they show

improvement in both academic performance and behavior. The Administrators

Technology has given us the ability to conduct

experiments we could never have run five years ago. The Teachers.

We're more enthusiastic to learn. The Students.

(Kleinsmith, 1997)

> If educators are expected to make the best use of emerging technologies, then we need to create a new culture of teaching and learning, including collegiality, new relationships with family and community, leadership and decision-making, students who are much more self-directed and interdependent, and new models of curriculum and assessment and our concept of time. (November, 2001b, p. 1)

A review of the literature reveals a dichotomy in the support among stakeholders for the use of technology in the schools. Some experts remain skeptical about the computer age and feel that it will have no more effect on education than did the use of television in the classroom beginning in the 1950s, while others caution of the potential of the negative effects of technology on students and society (Postman, 1992). Another review

of the literature indicates the growing concern over the extraordinary financial investment and human resources usurped by technology infusion (Anderson & Becker, 2001) as compared to only a recent emergence in the literature of technology's effectiveness on student achievement.

As the technology expenditures increased there have been emerging studies that are evaluating the use and impact on student learning. Technology, as any innovation in our system of education, raises persistent questions about the purposes of education. Is it to provide training in fundamental and basic skills? It is to prepare students for the work force? Is it to produce citizens for an effective democracy? Is it to produce an equitable society? Is it to produce broad, life-long learners? Is it to prepare students with critical thinking skills for a complex new world?

The literature clearly embraced the fact that technology is a necessary component in each one of the above questions. However, the report, "Teachers and Technology: Making the Connection," (U.S. Congress, Office of Technology Assessment, 1995) depicted administrators as impediments to school change and thus not many schools were doing a good job of infusing computers into the daily lives of teachers and students. The reality is that district leaders must think through why and how technology should be introduced throughout the schools or else schools will be left with battalions of expensive computers and other technologies that no one uses (Appalachia Educational Laboratory, 1999).

One review of the literature revealed the following Seven Realizations of Technology from a practicing superintendent:

1. Technology will not transform a mediocre school into a good one.

2. Understand why you are investing in technology.
3. Be aware of school culture – it is either a friend or an enemy.
4. Principals with technology skills have the edge.
5. Hire technology support staff now, or pay a high price later.
6. Do not start until a staff development program is in place.
7. Recognize that once you invest in technology, you have embarked on a fast and open road (Cooley, 1998).

For technology to be successful, curriculum, instructional leadership, personnel evaluation, staff development, and school environment must be considered. Fear of change must be overcome and all key players needed a strong leader's support throughout the process (Cafolla & Knee, 1995; Carter, 2000; CEO Forum, 1999; Donovan, 1999; Fullan, 1997; Fuller, 2000; Hall & Hord, 2001; Hargreaves, 1997). The literature clearly explains that putting technology into a school where the administration is not supportive is like throwing money away.

Furthermore, the review of the literature revealed the serious problem of how many school boards across our nation have approved millions of dollars in technology spending without first making sure teachers and administrators understand how technology will affect instruction and student learning (National Center for Technology Planning, 2001). Furthermore, innovation of new technologies has necessitated changes in a school's instructional delivery system - which in turn disrupts established conventions and routines. Thus a highly authoritative school culture inhibits technology innovation while a highly collaborative culture seems to welcome the change. Furthermore, according to the literature, a leader's (principal or superintendent) enthusiasm for technology is

infectious and his/her style of leadership is an important factor (if not the most important factor) in making change happen.

It is incumbent on the superintendents to assess principal's skills and abilities, and when necessary, provide extra training and supervision since it is the principal who is in each district building as the agent who leads the technology reform (Oberg, Hay & Henri, 2000; Pereus, 2001; Peterson, 1999; Rhoades & Houston, 1997; Roden,1997). Furthermore the literature reveals how a superintendent must comprehend what key support personnel are necessary to effectively infuse technology for learning and teaching. And in cases where good technological support was not provided, teachers, administrators, and ultimately the students stopped using the school technology.

Staff development is another crucial component for the effective use of technology for teaching and learning. The Office of Technology Assessment recommends spending thirty percent of total project funds on staff development. Various states throughout the nation have also made percent guidelines for professional development and have indicated specific required amounts for grant and aid recipients. Technology must also be viewed as an ongoing integral component for student success. The rapid pace of change in technology does have major budget implications; however, the literature offers ample information on total cost of ownership and other creative funding mechanisms school districts can use (Fitzgerald, 1999; Roberts, 2001).

Technology cannot be viewed as a panacea to education's problems, and should be implemented critically and cautiously (Healy, 1998) with the assurance that educators take charge of the technology practice in their classrooms. Technology infusion should

be initiated after careful examination of the educational goals for the learning community (Spillan & Regnier., 1998; Sergiovanni, 1996).

Research has shown that personal and motivational outcomes balanced with a focus on challenging standards and high achievement is vital for preparing students in this third millennium. In a learner-centered view of education, they are concerned with creating the kinds of experiences that produce, healthy people. Sergiovanni (1996) and Fullan (1997) purport that the purpose of education is to build learning communities that bring moral purpose back into teaching and reconnect teachers with the fundamental purpose of making a difference in young people's lives. At the same time, the literature shows that that education is shifting due to the exponential growth in access to information in the past fifty years and educators now need to foster lifelong learners to interpret the values we already know and to create new networks for dialog, reflection, and contextual applications of learning in our dynamic real world. Changes in our society indicate that students are now becoming knowledge producers (November, 2001). Students are now viewed as knowledge generators and active participants in their own learning as a result of innovative technologies. Teaching technologies have resulted in the sharing of power by the students and teachers.

The Leadership Role of the Superintendent

The role of a district superintendent as an instructional leader is extremely varied and complex. Leadership is often referred to more than a list of things that need to get done, it is more of an art form that is taken from the heart (Tirozzi, 2001). However in reality, the leader's (certification or) licensure is based on specific skills and standards as established by the Interstate School Leaders Licensure Consortium (ISLLC) of which,

New Jersey is one of twenty-four member states. These standards for school leaders are also compatible with the National Council for the Accreditation of Teacher Education (NCATE). In addition to the State of New Jersey's certification requirements, current literature indicates there are specific technology standards a superintendent should embrace. The Technology Standards for School Administrators (TSSA) are presently being reviewed and critiqued on a national level by administrators and key stakeholders. Basically these standards communicate "what administrators should know about and be able to do with technology and what leadership qualities facilitate use of technology in schools to improve student learning" (CNETS & ISTE, 2001). This investigative study will focus on the demands of a district superintendent as a technology leader.

Literature clearly demonstrates the need for assistance in infusing technology into our public schools. The consensus of the findings indicate how public schools and state boards of education should revisit teacher preparation to include demonstrated proficiency levels of teachers' technical skills and encourage teacher mentoring and training in the realm of technology. Literature also reveals that even with various technologies available in schools and teacher training, a key component to teacher success and ultimate improvement in student learning is the need for administrative support. However, the question that keeps surfacing is what technological skills, competencies and leadership characteristics do administrators need that would enable them to be effective educational leaders and supportive of the their staff's technology use?

One report states, "What has not been addressed to a significant extent in this and other related literature is the need to prepare our school leaders to effectively support

teachers; implementation and on-going usage of instructional technology" (Bozeman & Hiatt, 1999, p. 1).

Recently, the International Society for Technology in Education (ISTE) has also worked with educators, business, leaders, government agencies and educational stakeholders in PreK-12 education to develop national standards for the educational uses of technology that will facilitate school improvement in the United States. These standards are a larger standards document called the National Educational Technology Standards (NETS).

The literature clearly indicates the importance of technology in the educational arena and the current plethora of standards for students, teachers, and more recently administrators. However, there is an overwhelming void in research that addresses the needs and competencies in the area of technology for effective leadership as perceived by the actual practicing district superintendent.

In our technological society, the Internet has provided a vast source of current information. Using the tremendous power of search engines one can easily find many for profit and some free rubrics available for school districts to assess and evaluate their technology needs. Furthermore, there are rubrics available for students, teachers, administrators and any other interested party to evaluate his/her technology skills.

In the late 90s along with an Educational Technology and Whole School Reform Program, the state of New Jersey, largely with federal Goals 2000 aid, funded and implemented twenty-one (one in each county) Educational Training Centers (ETTCs) (Education Week, 2001). The impetus of these centers was to train the teachers across the state to use technology as a tool in the classroom. The centers have provided

technology-related professional development or other help to more than 100,000 teachers. In addition to the training available, the state budget for fiscal 2000-01 included roughly $60 million for technology in public schools and $8 million for private school technology. These entitlement funds are part of a five-year program that began during the 1997-98 school year and distributed through the state's Distance Learning Network Aid.

The state of New Jersey required all districts to submit a revised technology three-year plan by July 1, 2001. Part of the plan requires the school districts indicate the percent of the total district budget used for technology. As these statistics become available an even greater urgency will emerge for accountability and the best impact for technology use. This massive amount of financial expenditure on technology certainly increases the urgency for district superintendents to have the necessary competencies to make wise decisions. Unfortunately, the literature clearly indicates the proper competencies have not been put in place for both teachers and administrators prior to these massive expenditures (Jukes & McCain, 2001).

Recently, the Bill and Melinda Gates Foundation committed over $100 million to assist in the training of every superintendent and principal in our country. The New Jersey Educational Leadership Institute for Technology in Education (NJ ELITE) in partnership with the New Jersey Association for School Administrators (NJASA), New Jersey Department of Education (NJDOE) and the New Jersey Principals' and Supervisors' Association (NJPSA) is a direct result of this Gates Foundation (NJDOE, 2001a). This new Gates' initiative further indicates the concern and need for this investigative study into the administrator/leader's technological competencies as the

district educational leader.

Furthermore, both the public and elected officials have demanded accountability and measurable benchmarks to be implemented and met. Educators have become locked in a quagmire of standards versus standardization. The literature shows how schools are inundated with state mandates and standards to infuse throughout the curriculum. One of the hot topics in learning and teaching is technology. Although research indicates that school reform and change is usually a slow continuous process, with the advent of personal computers in schools there is neither the expectation of continuity nor the time to deliberate on just why the technologies are needed. In fact there is still no empirical data available that definitely supports technology as a worthy expenditure that ensures student success in meeting key benchmarks and standards.

To succeed in this postmodern era certain educational boundaries must dissolve. Just as the boundaries of space and time are being blurred by the use of the Superhighway of the Internet and broadband connectivity; so must the boundary between technology skill training and classroom integration. An educational leader must ensure that information technology training complements the needs of the classroom teachers (Swan & Mitrani, 1993) and ultimately enhances learning. The real difficulty here is to find an educational leader with all the necessary skills and competencies in leadership and both curricular content areas and technology to ensure that students are always benefiting (Brandt, 2000). The true crux of the question still remaining is whether or not a district superintendent recognizes this concept and is competent to offer solutions.

CHAPTER III

METHODOLOGY AND PROCEDURES

Introduction

As funding for technology increases, district superintendents are being held more and more accountable for technological effectiveness. There have been many opinions and questions regarding the influence of technology and its impact on the learning community. As technologies change at unimaginable speeds and become more and more abundant, the effective leader must develop a process to make informed decisions and an ability to implement them wisely. Relative to this dynamic and complex demand on superintendents, is the question: What competencies must the superintendent have to address these complex issues? What exactly does effective technology leadership mean? The characteristics, meaning, and significance of the superintendent as the technology leader must be determined and held constant, or any research study would be inconclusive and thus have little value.

The superintendent, in the role of district leader, must ensure an adequate return on technology investment, i.e. the educational bottom line such as better student preparation for life in the 21st century. However, the overarching realty is that expensive technology will yield little educational return until schools and districts address the need for professional development, technical support, and availability of appropriate software, classroom management, and curriculum integration based on district student goals. Just

what must the superintendent know and be able to do to guide his/her district on this dynamic journey to use technology effectively and infuse it wisely as a transparent tool? And, how did he/she learn these competencies?

Methods

The purpose of this chapter is to describe the methods and procedures used in data gathering to test the hypotheses in Chapter One of this study and draw conclusions. The survey questionnaire was an instrument designed by the researcher with a three-fold purpose in mind: to examine the respondent's perspective and awareness of changes in teaching and learning triggered by technology use, to examine how this perspective and awareness impact his/her district's technology implementation as a learning community and to determine the superintendents' self-reported modeling and efficacy level in technology use. The survey also collected the following district demographics: the district factor grouping, student population, number of school buildings, number of professional staff members, and the number of staff members in the following technology specific positions: curriculum support for technology infusion, coordinator for district technology purchases, staff for technology network administration or support, and staff for technical hardware/software support. There was an open-ended question at the end of survey to further expand the data collection. This chapter further describes how the data was gathered in this research.

In the data collection, participants in the study identified their perceived district technology implementation in the realm of their professional practice, assessment and evaluation, planning and vision, support and maintenance; their self-reported modeling and efficacy level and most effective technology learning method. Although these

themes were invisible to the participants they provided necessary categories for data analysis by the researcher.

The themes in the survey instrument are grounded in theory from the following expert sources in the field of technology. The list includes: Technology Standards for School Administrators, International Society for Technology in Education, National School Boards Association, and the Interstate School Leaders Licensure Consortium (CNETS & ISTE, 2001). Early in 2001 the initial draft of the first-of-its-kind set of standards defining what K-12 school administrators should know about, and be able to do with technology was released. This initiative along with various technology rubrics available on the Internet provided the framework for the survey instrument. As stated in eSchoolNews online, the Technology Standards for School Administrators "define neither the minimum nor maximum level of knowledge and skills required of a leader, and are neither a comprehensive laundry list, nor a guaranteed recipe for effective technology leadership," (ISTE, 2000).

The draft Technology Standards for School Administrators (TSSA) is currently being electronically evaluated (Internet) and field-tested by all interested stakeholders. The first draft, issued March 2, 2001, is intended to reflect a national consensus on the role school administrators should play in ensuring the effective use of technology in their schools. The draft encompasses six categories: leadership and vision; learning and teaching; productivity and professional practice; support, management, and operations; assessment and evaluation; and social, legal, and ethical issues. Within each category of these TSSA draft standards, a list of specific performance indicators further explain or measure how administrators can use and implement technology most effectively in their districts. The

TSSA creators (TSSA Collaborative: National School Boards Association (NSBA, http://www.nsba.org), National Association of Elementary School Principals (NAESP, http://www.naesp.org), National Association of Secondary School Principals (NASSP, http://www.principals.org), Consortium for School Networking (CoSN, http://www.cosn.org), North Central Regional Technology Consortium @ North Central Regional Education Laboratory (NCRT @ NCREL, http://www.ncrel.org), Southern Regional Education Board (SREB, http://www.sreb.org), Kentucky Department of Education (http://www.kde.state.ky.us), Mississippi Department of Education (http://www.mdek12.state.ms.us), Principals' Executive Program at the University of North Carolina (http://www.ga.unc.edu/pep), and Western Michigan University College of Education (http://www.wmich.edu/coe)) hope to follow the success of the ISTE's National Education Technology Standards (NETS) for students and teachers (CNETS & ISTE, 2001).

While the NETS standards were developed by a group of educators to help integrate technology at the classroom level, The TSSA standards take the focus off the classroom and place it on the schools as a whole. This is the crux of the importance for TSSA because school-wide and district-wide leadership is needed to ensure the success of technology programs. In fact TSSA tried to solicit the right organizations and people who had been very active in the technology standards movement. The consortium concentrated on getting feedback from K-12 administrators. Public feedback from educators and policy makers for this second draft was sought until June 30, 2001. Based on these comments, the TSSA Collaborative will refine its standards and the final release is expected to be formally available after October 1, 2001. Ultimately, the TSSA

Collaborative intends to create additional sets of role-specific standards for superintendents and other key administrative players.

The survey instrument was constructed following the guidelines explained in Rea & Parker (1997). The first four questions on the survey were relatively easy opinion questions about technology. The next section was comprised of the previously described themes using a four point Likert scale ranging from extremely important to extremely unimportant. This Likert scale was created by the researcher to enable the participants to easily check their perception level for each response. The next questions asked the respondents to self-report their modeling level and efficacy level (independent variables) and their definition of technology and learning method (an independent variable). The demographic questions were placed at the end of the survey. The final question was open-ended and asked the participants to include any comments he/she deemed necessary. The respondents' comments were analyzed and categorized by the researcher for presentation in the findings. The data is reported in the form of descriptive statistics using frequencies, percentages, means, standard deviations and one-way ANOVA's. Crosstabulation was used to identify the variations within the groups.

The independent variables in this study are the district factor grouping, the superintendent's modeling of technology, method of technology training, and the superintendent's self-reported efficacy level in the use of technology. The data collected for the study was used to address the following research questions:

Does the DFG of a school district significantly impact the perceptions of the superintendent toward technology implementation?

Does the superintendent's technology practice significantly impact the implementation of technology in his/her school district?

Does the superintendent's technology learning method significantly impact the implementation of technology in his/her school district?

Does the superintendent's self-reported level of technology efficacy significantly impact the implementation of technology in his/her school district?

Participants

As the district leader, superintendents must have complex and varied skills to ensure organizational success. Technology, since it is a huge financial investment and demands accountability, that is the bottom line of its effectiveness, currently causes new pressures for superintendents. The newness of this role and the focus of these topics are the basis for the researcher's participant selection. The subjects selected for this study were identified as practicing New Jersey K-12 superintendents in the State of New Jersey Directory. The sample population is in excess of 200 as identified in the New Jersey Directory.

Procedure

Superintendents were originally contacted via an introductory letter explaining the purpose of the pilot study, how they were randomly selected, the Institutional Review Board (IRB) approval and contact information with a request for their voluntary participation. The letter contained the survey instrument and also included a stamped self-addressed envelope to return the completed survey. The method chosen to communicate the research study was via the United States postal service. Electronic mail (email) was considered but not used by the researcher since the literature clearly

indicated this method might preclude some superintendents from participating in the study.

The survey design was used since the review of research-based literature indicated it is the most appropriate to collect the necessary data considering this population size. A pilot test was conducted to verify content and construct validity of the researcher's instrument prior to sending out full scale. The pilot studied consisted of 15 randomly (Witte & Witte, 1997) selected superintendents from the State of New Jersey's Superintendent Directory. The researcher performed a scale reliability analysis, which measured the internal consistency of the pilot test using the Statistical Product (SPSS, Inc, 1998) version 10.0. The Chronbach's scale reliability was done using the data collected from the seven respondents. Questions one through sixteen were used and the results showed an alpha of .8259, which is considered sound or acceptable for educational research.

Alan November, Ian Jukes, David Warlick and Dr. Jason Ohler, all experts in the field of technology, were also solicited to offer comments and constructive criticism on the survey instrument. The respondents indicated a need to reword the first four questions of the survey instrument for clarity and comprehension by the participants. Thus the researcher edited the pilot survey instrument based entirely on the results of the comments and recommendations of the aforementioned panel of experts.

The full study included the 217 remaining practicing Superintendents in the State of New Jersey. They were originally contacted via an introductory letter explaining the purpose of the study, the Institutional Review Board (IRB) approval and contact information with a request for their voluntary participation. The letter contained the

survey instrument and also included a stamped self-addressed envelope to return the completed survey. As previously mention, electronic mail (email) was considered but not used by the researcher since the literature clearly indicated this method might preclude some superintendents from participating in the study. The standardized alpha, reliability analysis, for the completed study was .8218, which is considered acceptable or strong for educational research.

CHAPTER IV

RESULTS

The purpose of this chapter is to analyze the data returned to the researcher via a 28-question survey instrument. The participants included the 217 New Jersey K-12 Superintendents remaining after the pilot study. These 217 superintendents were mailed the survey instrument via the U.S. postal service. Within approximately a one-month period, 114 respondents completed and returned the survey instrument. This represents a 52.5% response rate.

All 114 returned surveys were carefully reviewed and numbered to allow statistical analyses. The results showed that over 82% of the returned surveys were completed by the superintendent, 9.6% by the assistant superintendent, 5.3% by the director of technology and 2.6% by other (see Table 1).

Table 1

Survey Participants

Who Completed Survey. Superintendent (4); Assistant Superintendent (3); Director of Technology (2); Other (1).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Other	3	1.4	2.6	2.6
	Director of Tech	6	2.8	5.3	7.9
	Assistant Superintendent	11	5.1	9.6	17.5
	Superintendent	94	43.3	82.5	100.0
	Total	114	52.5	100.0	
Missing	System	103	47.5		
Total		217	100.0		

The survey had a basic three-fold purpose: to examine the respondent's perspective and awareness of changes in teaching and learning triggered by technology use, to examine how this perspective and awareness impact his/her district's technology implementation as a learning community and to determine the superintendent's self-reported modeling and efficacy level in computer use. The study also collected the following district demographics: the district factor grouping, student population, number of school building, number of professional staff members, and the number of staff members in the following technology specific positions: curriculum support for technology infusion, coordinator for district technology purchases, staff for technology network administration or support, staff for technical hardware/software support. There was an open-ended question at the end of the survey to further expand the data collection.

Response Data

The returned surveys provided a rich source of data for statistical analyses. Descriptive statistics, frequency and percent were used to determine the collective responses for the survey questions. The dependent variables were examined collectively and the results were disaggregated for further analyses to answer the research questions. The four independent variables used in this study were: the superintendent's self-reported efficacy level for computer use, the superintendent's self-reported technology learning method, the superintendent's self-reported modeling level for technology use and the superintendent's District Factor Grouping. As previously noted, school districts in the State of New Jersey are classified by their District Factor Grouping. The results show 95 of the respondents indicated the DFG for his/her district. Each of the nine DFG categories was represented in the results as indicated in Table 2.

Table 2

DFG Factor

DFG Factor. A = 1, B = 2, CD = 3, D = 4, DE = 5, FG = 6, GH = 7, I = 8, J = 9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A	6	2.8	6.3	6.3
	B	15	6.9	15.8	22.1
	CD	8	3.7	8.4	30.5
	D	4	1.8	4.2	34.7
	DE	14	6.5	14.7	49.5
	FG	13	6.0	13.7	63.2
	GH	13	6.0	13.7	76.8
	I	21	9.7	22.1	98.9
	J	1	.5	1.1	100.0
	Total	95	43.8	100.0	
Missing	System	122	56.2		
Total		217	100.0		

The first three questions of the survey asked simple questions requiring a (Yes, No, No Opinion) response to his/her perception. As indicated in Tables 3-5, the focus of these three questions was technology's impact on the culture of learning. The majority of the respondents, 78 or 69% indicated new measures of student assessment and achievement are needed to reflect technology's impact. The majority of the respondents, 69 or 61.1% indicated the Internet has created a new culture of learning shifting the control of information to students and families. However, the responses to the third question show only 48 or 42.1% perceived technology initiatives are based on empirical and practical information about where and how technology can benefit students. Collectively, this group of questions indicated that while more than half of the

respondents (over 61%) suggest an awareness of technology's impact on the culture of learning – 39% do not. Furthermore, approximately 58% of the respondents indicated technology initiatives are not always implemented in the most effective ways to benefit students.

Table 3

Question 1

New measures of student assessment & achievement are needed to reflect the impact of technology on student learning.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	10	4.6	8.8	8.8
	No	25	11.5	22.1	31.0
	Yes	78	35.9	69.0	100.0
	Total	113	52.1	100.0	
Missing	System	104	47.9		
Total		217	100.0		

Table 4

Question 2

Internet has created a new culture of learning shifting control of information to students & families.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No Opinion	5	2.3	4.4	4.4
	No	38	17.5	33.6	38.1
	Yes	69	31.8	61.1	99.1
	DiffOpinion	1	.5	.9	100.0
	Total	113	52.1	100.0	
Missing	System	104	47.9		
Total		217	100.0		

Table 5

Question 3

Technology initiatives are based on empirical and practical information to benefit students.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	9	4.1	7.9	7.9
	No	57	26.3	50.0	57.9
	Yes	48	22.1	42.1	100.0
	Total	114	52.5	100.0	
Missing	System	103	47.5		
Total		217	100.0		

The fourth question further identified the respondents' perceptions of technology's impact on learning. Respondents were asked to place a check indicating a yes to simple questions concerning new basic skills. For clarity and consistency, the questions included specific explanations for each basic skill. The results are indicated in Tables 6-8.

Table 6

Question 4: Computer Literacy

Technology use has created Computer Literacy as a new basic skill.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	3	1.4	2.7	2.7
	Yes	110	50.7	97.3	100.0
	Total	113	52.1	100.0	
Missing	System	104	47.9		
Total		217	100.0		

Table 7

Question Four: Information Literacy

Technology use has created Information Literacy as a new basic skill.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	9	4.1	7.9	7.9
	Yes	105	48.4	92.1	100.0
	Total	114	52.5	100.0	
Missing	System	103	47.5		
Total		217	100.0		

Table 8

Question Four: Communications Literacy

Technology use has created Communications Literacy as a new basic skill.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	22	10.1	19.3	19.3
	Yes	92	42.4	80.7	100.0
	Total	114	52.5	100.0	
Missing	System	103	47.5		
Total		217	100.0		

The results show 110 or 97.3% of the respondents indicated technology use has created Computer Literacy, how to use a computer to be technically proficient, as a new basic skill. The results show 105 or 92.1% of the respondents indicated technology use has created Information Literacy, how to access and validate information and understand the organization of information as a new basic skill. And 92 or 80.7% of the respondents indicated technology use has created Communications Literacy defined as how to

interpret and understand the basic grammar/structure of the Internet address (to establish new relationships) as a new basic skill.

The next section of the survey (questions 5 through 15) used a 4-point Likert scale, 4 = Extremely Important, 3 = Important, 2 = Unimportant and 1 = Extremely Unimportant, to collect the respondents' perceptions. These questions collected the data for the perceptions of the superintendent as the district technology leader and role model. Questions five and six collected the data for the superintendents' perceptions of personal technology use and technology as an effective tool for communication. As indicated in Tables 9-10, 113 of the 114 respondents or 99.1% consider personal technology use important or extremely important as an enhancement to their professional practice and individual productivity. The results show a similarity in the realm of the superintendents' use of technology as an effective tool for communication and collaboration with the entire learning community, 94.7 % or 108 respondents considered this important or extremely important. However, the level of importance did indicate a shift downward and included two responses in the extremely unimportant category. Collectively, over 90% of the respondents indicated their use of technology as important or extremely important in their position as the district leader and role model.

Table 9

Question Five

Personal Technology Use Enhances Professional Practice & Increases Individual Productivity

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unimportant	1	.5	.9	.9
	Important	52	24.0	45.6	46.5
	Extremely Important	61	28.1	53.5	100.0
	Total	114	52.5	100.0	
Missing	System	103	47.5		
Total		217	100.0		

Table 10

Question Six

Technology Provides an effective Tool for the District Leader to Collaborate with the entire Learning Community.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Extremely	2	.9	1.8	1.8
	Unimportant	4	1.8	3.5	5.3
	Important	57	26.3	50.0	55.3
	Extremely	51	23.5	44.7	100.0
	Total	114	52.5	100.0	
Missing	System	103	47.5		
Total		217	100.0		

The results for questions 11, 12 and 14 indicated a trend by the respondents in the realm of educational technology support and training. Over 94% of the respondents indicated as important or extremely important the need to provide professional staff with necessary technology training and support; similarly 93.8% or 108 responded the same

for fostering and nurturing a culture of life-long learning. The superintendents' perceptions on empowering staff to use educational technology in new and different ways indicated that 97% or 110 of the 113 respondents considered the presence of an instructional leader important or extremely important. These results are displayed in Tables 11-13.

Table 11

Question Eleven

Professional staff is encouraged to attend technology training, follow up support exists & release time is provided.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unimportant	6	2.8	5.3	5.3
	Important	43	19.8	38.1	43.4
	Extremely	64	29.5	56.6	100.0
	Total	113	52.1	100.0	
Missing	System	104	47.9		
Total		217	100.0		

Table 12

Question Twelve

Innovative technology practices for learning & teaching are assured by fostering & nurturing a culture of life-long learning by professional staff.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unimportant	7	3.2	6.2	6.2
	Important	53	24.4	46.9	53.1
	Extremely Important	53	24.4	46.9	100.0
	Total	113	52.1	100.0	
Missing	System	104	47.9		
Total		217	100.0		

Table 13

Question Fourteen

Direction to integrate technology tools into productive teaching & learning is provided in each district building by an instructional leader.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unimportant	3	1.4	2.7	2.7
	Important	54	24.9	47.8	50.4
	Extremely Important	56	25.8	49.6	100.0
	Total	113	52.1	100.0	
Missing	System	104	47.9		
Total		217	100.0		

Questions 7, 8, 9, 10, 13 and 15 collected the data for the perceptions of the superintendents in the realm of technology planning and vision. The results show over 92.9% of the respondents reported technology audits, ongoing technology funding support, and technology assessment prior to purchase are important or very important.

However, the results also identified some respondents who did not perceive these concepts as important. In fact 7 respondents reported technology audits are unimportant, one reported an audit was extremely unimportant, and 5 respondents or 4.4% reported ongoing funding support and assessment prior to purchase equally unimportant. Tables 14-16 show these results.

Table 14

Question Seven

Technology audits are conducted prior to purchasing hardware & software.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Extremely	1	.5	.9	.9
	Unimportant	7	3.2	6.2	7.1
	Important	66	30.4	58.4	65.5
	Extremely Important	39	18.0	34.5	100.0
	Total	113	52.1	100.0	
Missing	System	104	47.9		
Total		217	100.0		

Table 15

Question Eight

Technology funding is supported by regular, categorical & special-program budgets including partnerships & outside funding.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unimportant	5	2.3	4.4	4.4
	Important	52	24.0	45.6	50.0
	Extremely Important	57	26.3	50.0	100.0
	Total	114	52.5	100.0	
Missing	System	103	47.5		
Total		217	100.0		

Table 16

Question Nine

District schools assess student & staff use of hardware & software & technology/curriculum integration. Findings used for technology purchasing and staff development.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unimportant	5	2.3	4.4	4.4
	Important	58	26.7	51.3	55.8
	Extremely Important	50	23.0	44.2	100.0
	Total	113	52.1	100.0	
Missing	System	104	47.9		
Total		217	100.0		

While the results show 79.7% or 90 respondents considered an all-inclusive technology planning committee as important or extremely important, 23 of the respondents reported this type of a committee was unimportant. Three of the 23 indicated extremely unimportant, and one wrote in the comment – no students. The

results show 93.7% rated building level hardware/support personnel for professional staff as important or extremely important. Similarly, 94.7% of the respondents indicated that policies and procedures to ensure continuous technology improvements and replacement cycles are important or extremely important. These results are displayed in Tables 17-19.

Table 17

Question Ten

Technology committee includes superintendent, teachers, students, Businesses, community members to create district technology plan.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Extremely	3	1.4	2.7	2.7
	Unimportant	20	9.2	17.7	20.4
	Important	61	28.1	54.0	74.3
	Extremely	29	13.4	25.7	100.0
	Total	113	52.1	100.0	
Missing	System	104	47.9		
Total		217	100.0		

Table 18

Question Thirteen

Technology support is provided to faculty & staff by building level hardware/ Software technicians & network administrators

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Extremely	1	.5	.9	.9
	Unimportant	6	2.8	5.4	6.3
	Important	41	18.9	36.6	42.9
	Extremely	64	29.5	57.1	100.0
	Total	112	51.6	100.0	
Missing	System	105	48.4		
Total		217	100.0		

Table 19

Question Fifteen

Policies & procedures are in place to ensure continuous system improvements & support for technology replacement cyles.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Extremely Unimportant	1	.5	.9	.9
	Unimportant	5	2.3	4.4	5.3
	Important	55	25.3	48.7	54.0
	Extremely Important	52	24.0	46.0	100.0
	Total	113	52.1	100.0	
Missing	System	104	47.9		
Total		217	100.0		

For clarity and consistency, questions 16, 17, 18, 19 and 21 asked respondents to place a check next to simple statements. Questions 16, 17, 18, and 19 collected the data for the respondents' self-reported modeling, computer use efficacy level, definition of technology and technology learning methods. A very large percentage, 94.7 or 108 respondents indicated the importance of technology use as a model for other administrators, teachers and staff to emulate. The results show that 104 respondents or 92.9% rated themselves as proficient, computer use 3-5 times a week, or expert, computer use as much as possible for professional or personal practice. The data indicated 56.1% or 64 respondents acquired their skills independently, that is self-taught and 42.1% or 48 respondents indicated they learned their skills from peer/collegial assistance rather than formal courses or licensure work. A very low percentage indicated taking courses online, only 2.6% or three respondents. Tables 20-26 show these results.

Table 20

Question Sixteen

Effective Technology Use Provides a Model for other Administrators, Teachers & Staff to Emulate.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A Little	6	2.8	5.3	5.3
	Some	53	24.4	46.5	51.8
	A Great Deal	55	25.3	48.2	100.0
	Total	114	52.5	100.0	
Missing	System	103	47.5		
Total		217	100.0		

Table 21

Question Seventeen

Efficacy Level in Use of Computers, Expert (4), Proficient, Apprentice, Novice (1)

		Frequency	Percent	Valid Percent	Cumulative Percent
	Novice	2	.9	1.8	1.8
	Apprentice	6	2.8	5.4	7.1
Valid	Proficient	48	22.1	42.9	50.0
	Expert	56	25.8	50.0	100.0
	Total	112	51.6	100.0	
Missing	System	105	48.4		
Total		217	100.0		

Table 22

Question Nineteen: Self-Taught

Acquisition of technology - self-taught

		Frequency	Percent	Valid Percent	Cumulative Percent
	No	50	23.0	43.9	43.9
Valid	Yes	64	29.5	56.1	100.0
	Total	114	52.5	100.0	
Missing	System	103	47.5		
Total		217	100.0		

Table 23

Question Nineteen: Collegial Assistance

Acquisition of techology skills - peer/collegial assistance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	66	30.4	57.9	57.9
	Yes	48	22.1	42.1	100.0
	Total	114	52.5	100.0	
Missing	System	103	47.5		
Total		217	100.0		

Table 24

Question Nineteen: Classroom

Acquisition of technology skills - Classroom/Licensure course work

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	104	47.9	91.2	91.2
	Yes	10	4.6	8.8	100.0
	Total	114	52.5	100.0	
Missing	System	103	47.5		
Total		217	100.0		

Table 25

Question Nineteen: On-line Classes

Acquistion of technology skills, classes taken online

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	111	51.2	97.4	97.4
	Yes	3	1.4	2.6	100.0
	Total	114	52.5	100.0	
Missing	System	103	47.5		
Total		217	100.0		

Table 26

Question Nineteen: Other

Acquisition of technology skills, other

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	107	49.3	93.9	93.9
	Yes	7	3.2	6.1	100.0
	Total	114	52.5	100.0	
Missing	System	103	47.5		
Total		217	100.0		

In question 18 the respondents selected a definition for technology from three stated samples or other. The results show over 80% selected the broadest definition of technology that included all types of communication and presentation equipment. Very few of the respondents, 10 or 8.8% selected the restricted definitions of technology while 12 or 10.6% selected other. Table 27 shows these results.

Table 27

Question Eighteen

Definition of Technology. All equipment for communications (4); Calculators, cameras, computer systems & printers (3); Overhead projectors, cameras, systems, printers (2); Other (1)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Other	12	5.5	10.6	10.6
	Overhead, cameras, Computer systems	5	2.3	4.4	15.0
	Calculators,Projectors, Computer Systems	5	2.3	4.4	19.5
	All Communication Eqp.	91	41.9	80.5	100.0
	Total	113	52.1	100.0	
Missing	System	104	47.9		
Total		217	100.0		

Questions 20 and 21 collected data on the superintendent's perceptions of technology funding and motivating forces for technology purchases. Over 79% of the respondents indicated technology funding should be implemented by a permanent line item in the district budget including grants and/or business-partnerships while another 16.8% indicated that technology funding should be implemented by an administrative/board established amount for each district building. One respondent indicated as funds become available and three indicated other. The results show 38.9% of the respondents perceive the necessity to use technology as the motivational force for technology purchases while 47.8% perceive curriculum requirements as the motivational force for technology purchases. Two respondents indicated staff requests as the motivational force and 13 respondents indicated other. Tables 28 and 29 show these results.

Table 28

Question Twenty

What best describes your perception of how technology funding is implemented. Permanent line item (4); Administrative/Board established amount (3) As funds become available (2); Other (1).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Other	3	1.4	2.7	2.7
	As Funds	1	.5	.9	3.5
	Adm/Brd Decision	19	8.8	16.8	20.4
	Permanent line item	90	41.5	79.6	100.0
	Total	113	52.1	100.0	
Missing	System	104	47.9		
Total		217	100.0		

Table 29

Question Twenty-One

What triggers technology purchases. Curriculum requirements (4) ; Use technology (3); Staff requests (2); Other (1).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Other	13	6.0	11.5	11.5
	Staff Requests	2	.9	1.8	13.3
	Use Technology	44	20.3	38.9	52.2
	Curriculum	54	24.9	47.8	100.0
	Total	113	52.1	100.0	
Missing	System	104	47.9		
Total		217	100.0		

Questions 22, 23, 24, and 25 collected the following district demographics: Student population, number of school buildings and number of professional staff members. The

data was collapsed into groups to present an overview of the wide range of K-12 district sizes. Table 30 shows the grouped results.

Table 30

Demographics

Student Population (Grouped)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-2000	36	16.6	31.9	31.9
	2001-4000	38	17.5	33.6	65.5
	4001+	39	18.0	34.5	100.0
	Total	113	52.1	100.0	
Missing	System	104	47.9		
Total		217	100.0		

Number of School Buildings (Grouped)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-4	35	16.1	31.0	31.0
	5-9	58	26.7	51.3	82.3
	10+	20	9.2	17.7	100.0
	Total	113	52.1	100.0	
Missing	System	104	47.9		
Total		217	100.0		

Number of Professional Staff Members in District (Grouped)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-150	24	11.1	21.6	21.6
	151-300	37	17.1	33.3	55.0
	301-450	21	9.7	18.9	73.9
	451+	29	13.4	26.1	100.0
	Total	111	51.2	100.0	
Missing	System	106	48.8		
Total		217	100.0		

Question 26 collected data for the districts' specific technology positions. The results showed 12.4% of the respondents had no professional staff in the role of curricular technology infusion while 3.8% indicated they outsourced this position. The results

showed 6.4% of the respondents had no district technology coordinator while 1.9% responded the position was outsourced. The respondents indicated 16.4% did not have district network administrators or support people while 7.6% indicated the position was outsourced. The results showed 12% of the districts did not report technology technicians for hardware/software support while 4.8% indicated the position was outsourced. Thus the collective results suggest there are still school districts that do not provide technology support for curricular infusion, coordinators for technology purchases, network administrators and technicians for hardware/software.

Table 31 represents the respondents' comments written on the returned surveys and any responses to the open-ended question, number 28.

Table 31

Question Twenty-Eight

Respondent	Comments Written on Survey
#1	"Technology must reflect curriculum needs. If you can't identify the use you shouldn't purchase the hardware. It is important to have a curricular support resource for staff in need of such a service and for overall use of software"
#25	"I often find it comical, yet frustrating, to find that districts who boast of having a lot of computer and internet access do not have an answering machine in their main or special services offices? I think we need to prioritize our technological needs a little better?"
#26	#11 important for technology planning committee but clearly indicated "no" for student participant.
#27	"principals and district personnel" are the curriculum support people for technology infusion
#29	"technology definition is anything that extends human capabilities".
#35	"I serve as the Technology Coordinator listed in question #26". This survey was completed by the Superintendent (question #27)
#46	#12 important for staff training but crossed out "and release time is provided to the participants".
#51	#2 new culture of learning has shifted control – wrote in not yet #3 technology initiatives based on empirical and practical information to benefit students – wrote in "getting better"
#53	#18 added to the definitions of technology -"Technology is ongoing both in infusion and learning".
#56	#18 added to the definitions of technology – "Technology is a broad term applicable to a great many items. Districts have the responsibility to research this tool as they do others."
#65	#19 learning methods – wrote in "thigh school students teach me" (technology)
#67	"combination of all methods" Learning Method question #19
#90	#18 added to the definitions of technology – "2 way communication – gain information and disseminate information"
#92	#2 new culture of learning has shifted control wrote in "… in transition"
	Answers to the open-ended question #28 Any additional comments concerning technology implementation practices and/or competencies in your role as district leader.
#37	"Technology purchases should reflect labor force requirements, preparation for college, self interest to expand ability to do research"
#90	"Our district is very technology dependent – e-mail, shared folders, e-

	forms, student schedule, data base, business functions, web based programs. Staff has grown very dependent on technology. 4 years ago at age 48, I decided that I could either become proficient or be left behind."
#92	"greatest block to technology usage/integration is teachers … even with substantial support for training" "cost is prohibitive in expanding technology … new and replacement … we are converting to straight leasing and moving away from purchase … this will build capacity to develop permanent lines of finding. and will support reasonable replacement"

Although there were not an abundance of written comments, a view of all of them does suggest an awareness for the newness of technology as a communications tool, and concern for technology's cost and technology's methods of implementation. Furthermore two of the comments indicated negative perceptions towards technology implementation or the lack of empowering through technology use. The respondent who explicitly denounced student participation on a technology committee and the respondent who explicitly denied release time for ongoing staff development demonstrated this theme.

The trend throughout the responses was the majority showed evidence of a technology savvy approach to their role as district leader. The data also suggests the respondents have an awareness of technology's impact on teaching and learning. To answer the research questions, the data had to be disaggregated and analyzed using one-way ANOVAs and Crosstabulation.

Answers to the Research Questions

A one-way ANOVA was calculated to compare means between the DFG groups to answer the first research question. Does the DFG of a school district significantly impact the perceptions of the superintendent toward technology implementation?

The ANOVA shows F values that indicated some variations between the groups. The Internet shifting control of information with an F value of 2.087 is significant at the .05

level and indicates more variation than most of the other questions with F values ranging from .563 (little variation) to 1.676 (slightly more variation) but are not statistically significant. The most significant variation between groups is in the realm of ongoing professional training for staff as indicated by a 3.284 F value and a significance of .003 at the .05 level. Table 32 displays these results.

Table 32 ANOVA: District Factor Grouping

		Sum of Squares	df	Mean Square	F	Sig.
New Measures of student assessment & achievement are needed to reflect impact of technology on student learning.	Between Groups	2.146	8	.268	.563	.805
	Within Groups	40.492	85	.476		
	Total	42.638	93			
Internet has created a new culture of learning shifting control of nformation to students and families.	Between Groups	5.826	8	.728	2.087	.046
	Within Groups	29.663	85	.349		
	Total	35.489	93			
Technology initiatives are based on empirical and practical information to benefit students.	Between Groups	3.171	8	.396	1.075	.388
	Within Groups	31.714	86	.369		
	Total	34.884	94			
Personal technology use enhances professional practice and increases individual productivity.	Between Groups	2.317	8	.290	1.073	.390
	Within Groups	23.220	86	.270		
	Total	25.537	94			
Technology provides an effective tool for the district leader to communicate and collaborate with his/her entire learning community.	Between Groups	4.170	8	.521	1.464	.183
	Within Groups	30.630	86	.356		
	Total	34.800	94			
Technology audits are conducted prior to purchasing hardware and software.	Between Groups	3.087	8	.386	1.033	.418
	Within Groups	31.764	85	.374		
	Total	34.851	93			
Technology funding is supported by regular, categorical and special-program budgets including partnerships and funding from outside sources.	Between Groups	3.571	8	.446	1.368	.222
	Within Groups	28.050	86	.326		
	Total	31.621	94			

ANOVA: District Factor Grouping		Sum of Squares	df	Mean Square	F	Sig.
District schools assess student & staff use of hardware & software & technology/curriculum integration. Findings are used to refine the school plan for purchasing and staff development.	Between Groups Within Groups Total	2.584 27.852 30.436	8 85 93	.323 .328	.968	.453
Technology committee includes superintendent, teachers, students, businesses and members of the community.	Between Groups Within Groups Total	3.687 44.313 48.000	8 86 94	.461 .515	.894	.525
Professional staff is encouraged to attend technology training on an ongoing basis, follow-up support exists, and release time is provided to the participants.	Between Groups Within Groups Total	7.892 25.834 33.726	8 86 94	.987 .300	3.284	.003
Innovative Practices for learning & teaching are assured by fostering & nurturing a culture of life-long learning by the professional staff.	Between Groups Within Groups Total	2.290 34.299 36.589	8 86 94	.286 .399	.718	.675
Technology support is provided to faculty staff by building hardware/software technicians and network administrators.	Between Groups Within Groups Total	3.818 35.671 39.489	8 85 93	.477 .420	1.137	.347
Direction to integrate technology tools into productive teaching learning is provided in each district building by an instructional leader.	Between Groups Within Groups Total	2.437 25.247 27.684	8 86 94	.305 .294	1.038	.414
Policies & Procedures are in place to ensure continuous improvements and support for technology replacement cycles.	Between Groups Within Groups Total	4.666 29.293 34.589	8 86 94	.583 .348	1.676	.116

Crosstabulation was done for these two significant areas to determine where the variation was between the groups. The results indicated the following percentages for the Internet has not created a new culture of learning shifting control of information to students and families: Group A 0%, B 50%, CD 62 1/2%, D 25%, DE 25%, FG 23%, GH 39%, I 29%, J 100%. Five respondents indicated it is unimportant to encourage ongoing professional staff development, Group B = 1, CD = 2, GH =2. On the other hand, the results indicate some respondents considered ongoing professional staff development extremely important. The percentages by DFG are A = 67%, B = 27%, CD = 25%, D= 100%, DE = 79%, FG = 69%, GH – 39%, I = 67% and J= 100%. These Crosstabulation results are shown in Table 33.

Table 33

CrossTab: DFG/Culture of Learning and Technology Training: Question Two & Eleven

Internet has created a new culture of learning shifting control of information to students & families. * DFG Factor. A = 1, B = 2, CD = 3, D = 4, DE = 5, FG = 6, GH = 7, I = 8, J = 9 Crosstabulation

Count

		DFG Factor. A = 1, B = 2, CD = 3, D = 4, DE = 5, FG = 6, GH = 7, I = 8, J = 9									
		A	B	CD	D	DE	FG	GH	I	J	Total
Internet has created a new culture of learning shifting control of information to students & families.	No Opinion		1	1				1	2		5
	No		7	5	1	9	3	5	6	1	37
	Yes	5	6	2	3	5	10	7	13		51
	DiffOpinion	1									1
Total		6	14	8	4	14	13	13	21	1	94

Profession staff is encouraged to attend technology training, follow support exists, release time is provided. * DFG Factor. A = 1, B = 2, CD = 3, D = 4, DE = 5, FG = 6, GH = 7, I = 8, J = 9 Crosstabulation

Count

		DFG Factor. A = 1, B = 2, CD = 3, D = 4, DE = 5, FG = 6, GH = 7, I = 8, J = 9									
		A	B	CD	D	DE	FG	GH	I	J	Total
Profession staff is encouraged to attend technology training, follow support exists, release time is provided.	Unimportant		1	2				2			5
	Important	2	10	4		3	4	6	7		36
	Extremely Important	4	4	2	4	11	9	5	14	1	54
Total		6	15	8	4	14	13	13	21	1	95

The second research question asked: Does the superintendent's technology practice significantly impact the implementation of technology in his/her school district? The superintendent's self-reported modeling of technology indicates significant variations in a district's implementation of technology. ANOVA results are in Table 34.

Table 34 ANOVA: Superintendent's Modeling of Technology

		Sum of Squares	df	Mean Square	F	Sig.
New Measures of student assessment & achievement are needed to reflect impact of technology on student learning.	Between Groups	.387	2	.193	.456	.635
	Within Groups	46.693	110	.424		
	Total	47.080	112			
Internet has created a new culture of learning shifting control of information to students and families.	Between Groups	2.077	2	1.039	3.057	.051
	Within Groups	37.374	110	.340		
	Total	43.658	112			
Technology initiatives are based on empirical and practical information to benefit students.	Between Groups	2.077	2	2.198	6.214	.003
	Within Groups	39.262	111	.354		
	Total	43.658	113			
Personal technology use enhances professional practice and increases individual productivity.	Between Groups	13.029	2	6.514	41.577	.000
	Within Groups	17.392	111	.157		
	Total	30.421	113			
Technology provides an effective tool for the district leader to communicate and collaborate with his/her entire learning community.	Between Groups	12.074	2	6.037	19.307	.000
	Within Groups	34.707	111	.313		
	Total	46.781	113			
Technology audits are conducted prior to purchasing hardware and software.	Between Groups	.689	2	.344	.916	.403
	Within Groups	41.347	110	.376		
	Total	42.035	112			
Technology funding is supported by regular, categorical and special-program budgets including partnerships and funding from outside sources.	Between Groups	1.679	2	.839	2.546	.083
	Within Groups	36.602	111	.330		
	Total	32.281	113			

ANOVA: Superintendent's Modeling of Technology		Sum of Squares	df	Mean Square	F	Sig.
District schools assess student & staff use of hardware & software & technology/curriculum integration. Findings are used to refine the school plan for purchasing and staff development.	Between Groups Within Groups Total	3.743 33.336 37.080	2 110 112	1.872 .303	6.167	.003
Technology committee includes superintendent, teachers, students, businesses and members of the community.	Between Groups Within Groups Total	11.586 49.335 60.920	2 110 112	5.793 .448	12.916	.000
Professional staff is encouraged to attend technology training on an ongoing basis, follow-up support exists, and release time is provided to the participants.	Between Groups Within Groups Total	2.214 38.016 40.230	2 110 112	1.107 .347	3.203	.044
Innovative Practices for learning & teaching are assured by fostering & nurturing a culture of life-long learning by the professional staff.	Between Groups Within Groups Total	5.131 36.143 41.274	2 110 112	2.566 .329	7.809	.001
Technology support is provided to faculty staff by building hardware/software technicians and network administrators.	Between Groups Within Groups Total	7.399 38.601 46.000	2 109 111	3.699 .354	10.446	.000
Direction to integrate technology tools into productive teaching learning is provided in each district building by an instructional leader.	Between Groups Within Groups Total	4.905 29.236 34.142	2 110 112	2.453 .266	9.228	.000
Policies & Procedures are in place to ensure continuous improvements & support for technology replacement cycles.	Between Groups Within Groups Total	5.770 37.310 43.080	2 110 112	2.885 .339	8.506	.000

Each concept showing statistically significant variation was further examined using a Crosstabulation, the categories included None, A Little, Some and A Great Deal – no respondent selected the None category. The view of the superintendents' self-reported modeling is in Table 35.

Table 35

Superintendent's Modeling of Technology

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Little	6	2.8	5.3	5.3
	Some	53	24.4	46.5	51.8
	A Great Deal	55	25.3	48.2	100.0
	Total	114	52.5	100.0	
Missing	System	103	47.5		
Total		217	100.0		

With an F value of 6.214 and significance of .003, the results showed that 48 respondents indicated that technology initiatives are based on empirical and practical information to benefit students, 32 out of these 48 respondents, or 67% implement modeling a great deal, 29% some and 4% little. Comparing these results to those respondents answering no to this same question indicated a lower percentage in modeling a great deal – a 30 point drop to 37%, and an increase to 58% for some modeling and 5% little. These results are in Table 36.

Table 36

CrossTab Modeling/Technology Initiatives: Question Three

Technology initiatives are based on empirical and practical information to benefit students * Superintendent's Modeling of Technology Crosstabulation

Count

		Superintendent's Modeling of Technology			
		Little	Some	A Great Deal	Total
Technology initiatives are based on empirical and practical information to benefit students	No Opinion	1	6	2	9
	No	3	33	21	57
	Yes	2	14	32	48
Total		6	53	55	114

The highest F value, 41.577 and significant at .000 for the superintendent's modeling of technology was in the realm of personal technology use enhances professional practice and increases individual productivity. The Crosstabulation (see Table 37) indicated 41 out of the 52 or 79% of the respondents who perceived this concept important implement some modeling, and 14% a great deal. The results also show that 20% of the respondents who perceived this extremely important model some while 79% model a great deal.

Table 37

CrossTab Modeling/Personal Technology Use: Question Five

Personal Technology Use Enhances Professional Practice & Increases Individual Productivity * Superintendent's Modeling of Technology Crosstabulation

Count

		Superintendent's Modeling of Technology			
		Little	Some	A Great Deal	Total
Personal Technology Use Enhances Professional Practice & Increases Individual Productivity	Unimportant	1			1
	Important	4	41	7	52
	Extremely Important	1	12	48	61
Total		6	53	55	114

The second highest F value, 19.307 and significant at .000 for the superintendent's modeling of technology was in the realm of technology provides an effective tool for the district leader to communicate and collaborate with the learning community. The results show four of the respondents (out of 114) perceived this concept as unimportant. Out of the 57 respondents who perceive communication and collaboration as important 5% model little, 67% model some, and 28% a great deal. The results (see Table 38) also show that of the 51 respondents who perceive communication and collaboration extremely important 22% model some and 76% a great deal.

Table 38

CrossTab Modeling/Communications' Tool: Question Six

Technology Provides an effective Tool for the District Leader to Communicate & Collaborate with Learning Community. * Superintendent's Modeling of Technology Crosstabulation

Count

		Superintendent's Modeling of Technology			
		Little	Some	A Great Deal	Total
Technology Provides an effective Tool for the District Leader to Communicate & Collaborate with Learning Community.	Extremely Unimportant		2		2
	Unimportant	2	2		4
	Important	3	38	16	57
	Extremely Important	1	11	39	51
Total		6	53	55	114

The results showed a statistical significance, .003 with an F value of 6.177 for the concept of assessing student and staff use of hardware and software and technology/curriculum integration as benchmarks prior to implementing technology purchases and staff development. The Crosstabulation (see Table 39) indicated of the 58 respondents who perceive this concept as important 60% model some and 35% model a great deal. Of the 50 respondents who perceived this extremely important 34% model some and 64% model a great deal.

Table 39

CrossTab Modeling/Purchasing & Integration Initiatives: Question Nine

District schools assess student & staff use of hardware & software & technology/curriculum integration. Findings used for technology purchasing and staff development. * Superintendent's Modeling of Technology Crosstabulation

Count

		Superintendent's Modeling of Technology			
		Little	Some	A Great Deal	Total
District schools assess student & staff use of hardware & software & technology/curriculum integration. Findings used for technology purchasing and staff development.	Unimportant	2	1	2	5
	Important	3	35	20	58
	Extremely Important	1	17	32	50
Total		6	53	54	113

The results indicated an even greater variation in the area of an all inclusive technology committee with an F value of 12.916 and significant at .000. As indicated in Table 40, of the 54% who perceived an all inclusive technology committee as important, 53% model some and 44% model a great deal. Of the 26% who perceive this concept as extremely important, 24% model some and 76% model a great deal.

Table 40

CrossTab Modeling/Technology Committee: Question Ten

Technology committee includes superintendent, teachers, students, businesses & community member to create district technology plan. * Superintendent's Modeling of Technology Crosstabulation

Count

		Superintendent's Modeling of Technology			
		Little	Some	A Great Deal	Total
Technology committee includes superintendent, teachers, students, businesses & community member to create district technology plan.	Extremely Unimportant	2		1	3
	Unimportant	2	14	4	20
	Important	2	32	27	61
	Extremely Important		7	22	29
Total		6	53	54	113

The results show less variation in the area of encouraging and supporting professional development with an F value of 3.203 but still statistically significant at .044. The Crosstabulation (see Table 41) indicated of the 38% who perceived this important 53% model some and 40% model a great deal. Of the 57% who perceived this extremely important 41% model some and 56% model a great deal. A developing trend is that the results suggest higher perceived levels of importance by the respondent for the various technology concepts also indicate higher levels of technology modeling by the respondent.

Table 41

CrossTab Modeling/Technology Training: Question Eleven

Profession staff is encouraged to attend technology training, follow support exists, release time is provided. * Superintendent's Modeling of Technology Crosstabulation

Count

		Superintendent's Modeling of Technology			
		Little	Some	A Great Deal	Total
Profession staff is encouraged to attend technology training, follow support exists, release time is provided.	Unimportant	1	4	1	6
	Important	3	23	17	43
	Extremely Important	2	26	36	64
Total		6	53	54	113

The results show more variation in the area of fostering and nurturing a culture of life-long learning for the professional staff with an F value of 7.809 and statistically significant at .001. The results of the Crosstabulation (see Table 42) show of the 53 respondents who perceived this important 57% model some and 38% model a great deal. Of the 53 respondents who perceived this as extremely important 32% model some and 64% model a great deal.

Table 42

CrossTab Modeling/Life-Long Learning: Question 12

Innovative technology practices for learning & teaching are assured by fostering & nurturing a culture of life-long learning by professional staff. * Superintendent's Modeling of Technology Crosstabulation

Count

		Superintendent's Modeling of Technology			
		Little	Some	A Great Deal	Total
Innovative technology practices for learning & teaching are assured by fostering & nurturing a culture of life-long learning by professional staff.	Unimportant	1	6		7
	Important	3	30	20	53
	Extremely Important	2	17	34	53
Total		6	53	54	113

The results show a slightly higher variation in the area of providing faculty with building level technology support, with an F value of 10.446 and statistically significant at .000. The Crosstabulation (see Table 43) indicated of the 41 respondents who perceived this area as important 66% model some, and 32% model a great deal. Of the 64 respondents who perceived this as extremely important 30% model some and 64% model a great deal. The evidence still supports the aforementioned trend.

Table 43

CrossTab Modeling/Technology Support: Question Thirteen

Technology support is provided to faculty & staff by building level hardware/software technicians & network administrators. * Superintendent's Modeling of Technology Crosstabulation

Count

		Superintendent's Modeling of Technology			
		Little	Some	A Great Deal	Total
Technology support is provided to faculty & staff by building level hardware/software technicians & network administrators.	Extremely Unimportant		1		1
	Unimportant	1	5		6
	Important	1	27	13	41
	Extremely Important	4	19	41	64
Total		6	52	54	112

The results show slightly less variation in the area of providing direction for professional staff to integrate technology by instructional leaders, with an F value of 9.228 and statistically significant at .000. Of the 54 respondents who perceived this as important, 63% model some and 32% model a great deal, Table 44. The respondents who perceived this as extremely important, 30% model some and 66% model a great deal.

Table 44

CrossTab Modeling/Technology Instructional Leader: Question 14

Direction to integrate technology tools into productive teaching & learning is provided in 'district building by an instructional leader. * Superintendent's Modeling of Technology Crosstabulation

Count

		Superintendent's Modeling Technology			
		Little	Some	A Great Deal	Total
Direction to integrate technology tools into productive teaching learning is provided each district building by an instructional leader.	Unimportant	1	2		3
	Important	3	34	17	54
	Extremely	2	17	37	56
Total		6	53	54	113

The final concept in the realm of superintendent's modeling of technology is his/her perception of having policies and procedures in place to ensure continuous system improvement and support for technology replacement cycle. The results show slightly less variation with an F value of 8.506 and a statistical significance of .000. Of the 55 respondents who perceived this as important 60% model some and 46% model a great deal. As indicated in Table 45, of the 52 respondents who perceived this as extremely important 31% model some and 65% model a great deal. The results clearly indicate the superintendents modeling practices do significantly impact the implementation of technology in his/her district.

Table 45

CrossTab Modeling/Technology Replacement Cycles: Question Fifteen

Policies & procedures are in place to ensure continuous system improvements & support for technology replacement cyles. * Superintendent's Modeling of Technology Crosstabulation

Count

		Superintendent's Modeling of Technology			
		Little	Some	A Great Deal	Total
Policies & procedures are in place to ensure continuous system improvements & support for technology replacement cyles.	Extremely Unimportant		1		1
	Unimportant	2	3		5
	Important	2	33	20	55
	Extremely Important	2	16	34	52
Total		6	53	54	113

The third research question asked: Does the superintendent's technology learning method significantly impact the implementation of technology in his/her school district? The learning methods were grouped and coded to run the ANOVA, Table 46 shows the grouping and coding.

Table 46

Learning Method of Superintendent (Coded)

Learning Method of Superintendent (Coded)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No Learning Method Used	4	1.8	3.5	3.5
	Self Taught (Only)	39	18.0	34.2	37.7
	Peer/Collegial Learnin (Only)	27	12.4	23.7	61.4
	Formal Courses (Only	1	.5	.9	62.3
	Two or more Learning Methods Used	43	19.8	37.7	100.0
	Total	114	52.5	100.0	
Missing	System	103	47.5		
Total		217	100.0		

The results of the ANOVA do indicate slight variation with F values ranging from .172 to 1.662; however no areas indicated any statistically significant results. This suggests the superintendent's learning method does not impact the implementation of technology in his/her district. The ANOVA results are presented in Table 47.

Table 47 ANOVA: Superintendent's Learning Method

		Sum of Squares	df	Mean Square	F	Sig.
New Measures of student assessment and achievement are needed to reflect impact of technology on student learning.	Between Groups	.918	4	.230	.537	.709
	Within Groups	46.161	108	.427		
	Total	47.080	112			
Internet has created a new culture of learning shifting control information to students and families.	Between Groups	.625	4	.156	.435	.783
	Within Groups	38.826	108	.356		
	Total	39.451	112			
Technology initiatives are based on practical to benefit students.	Between Groups	1.007	4	.252	.643	.633
	Within Groups	42.651	109	.391		
	Total	43.658	113			
Personal technology use enhances professional practice and increases individual productivity.	Between Groups	.964	4	.241	.892	.472
	Within Groups	29.457	109	.270		
	Total	30.421	113			
Technology provides an effective tool for the district leader to communicate and collaborate with his/her entire learning community.	Between Groups	1.323	4	.331	.793	.532
	Within Groups	45.457	109	.417		
	Total	46.781	113			
Technology audits are conducted prior to purchasing hardware and software.	Between Groups	.333	4	.386	1.033	.418
	Within Groups	41.702	108	.374		
	Total	42.035	112			
Technology funding is supported by regular and categorical, special-program budgets including partnerships and funding from outside sources.	Between Groups	1.593	4	.398	1.183	.322
	Within Groups	36.688	109	.337		
	Total	38.281	113			

ANOVA: Superintendent's Learning Method			Sum of Squares	df	Mean Square	F
District schools assess student and staff use of hardware and software and technology/curriculum integration. Findings are used to refine the school plan for purchasing and staff development.	Between Groups Within Groups Total	1.566 35.688 38.281	4 108 112	.392 .329	1.191	.319
Technology committee includes superintendent, teachers, students, businesses and members of the community.	Between Groups Within Groups Total	.385 60.535 60.929	4 108 112	9.63 4E-02 .561	.172	.952
Professional staff is encouraged to attend technology training on an ongoing basis, follow-up support exists, and release time is provided to the participants.	Between Groups Within Groups Total	1.142 39.088 40.230	4 108 112	.286 .362	.789	.535
Innovative technology practices for learning and teaching are assured by fostering and nurturing a culture of life-long learning by the professional staff.	Between Groups Within Groups Total	.754 40.521 41.274	4 108 112	.188 .375	.502	.734
Technology support is provided to faculty staff by building hardware/software technicians and network administrators.	Between Groups Within Groups Total	1.548 44.452 46.000	4 107 111	.387 .415	.932	.448
Direction to integrate technology tools into productive teaching learning is provided in each district building by an instructional leader.	Between Groups Within Groups Total	.629 33.513 34.142	4 108 112	.157 .310	.506	.731
Policies and Procedures are in place to ensure continuous improvements and support for technology replacement cycles.	Between Groups Within Groups Total	2.498 40.582 43.080	4 108 112	.624 .376	1.662	.164

The fourth research question asked: Does the superintendent's self-reported level of technology efficacy significantly impact the implementation of technology in his/her school district? The results of the one-way ANOVA (see Table 48) indicated three areas of statistical significance although the other concepts did show slight variations with F values ranging from .310 to 1.568 but still not statistically significant.

Table 48 ANOVA: Superintendent's Self-Reported Efficacy Level

		Sum of Squares	df	Mean Square	F	Sig.
New Measures of student assessment & achievement are needed to reflect impact of technology on student learning.	Between Groups	4.648	3	1.549	3.976	.010
	Within Groups	41.694	107	.390		
	Total	46.342	110			
Internet has created a new culture of learning shifting control of information to students and families.	Between Groups	1.078	3	.359	1.011	.391
	Within Groups	38.022	107	.355		
	Total	39.099	110			
Technology initiatives are based on empirical and practical information to benefit students.	Between Groups	.482	3	.161	.407	.748
	Within Groups	42.625	108	.234		
	Total	43.107	111			
Personal technology use enhances professional practice and increases individual productivity.	Between Groups	4.732	3	1.574	6.736	.000
	Within Groups	25.241	108	.234		
	Total	29.964	111			
Technology provides an effective tool for the district leader to communicate and collaborate with his/her entire learning community.	Between Groups	4.235	3	1.412	3.651	.015
	Within Groups	41.756	108	.387		
	Total	45.991	111			
Technology audits are conducted prior to purchasing hardware and software.	Between Groups	1.271	3	.424	1.143	.335
	Within Groups	39.666	107	.371		
	Total	40.937	110			
Technology funding is supported by regular and categorical, special-program budgets including partnerships and funding from outside sources.	Between Groups	.321	3	.107	.310	.818
	Within Groups	37.357	108	.346		
	Total	37.679	111			

ANOVA: Superintendent's Self-Reported Efficacy Level		Sum of Squares	df	Mean Square	F	Sig.
District schools assess student & staff use of hardware & software & technology/curriculum integration. Findings are used to refine the school plan for purchasing and staff development.	Between Groups Within Groups Total	1.076 35.266 36.342	3 107 110	.359 .330	1.088	.357
Technology committee includes superintendent, teachers, students, businesses and members of the community.	Between Groups Within Groups Total	2.503 57.461 59.964	3 108 111	.834 .532	1.568	.201
Professional staff is encouraged to attend technology training on an ongoing basis, follow-up support exists, and release time is provided to the participants.	Between Groups Within Groups Total	.646 39.345 39.991	3 108 111	.215 .364	.591	.622
Innovative Practices for learning & teaching are assured by fostering & nurturing a culture of life-long learning by the professional staff	Between Groups Within Groups Total	1.268 39.652 40.920	3 108 111	.423 .367	1.151	.332
Technology support is provided to faculty staff by building hardware/software technicians and network administrators.	Between Groups Within Groups Total	.869 44.879 45.748	3 107 110	.290 .419	.690	.560
Direction to integrate technology tools into productive teaching learning is provided in each district building by an instructional leader.	Between Groups Within Groups Total	1.211 32.646 3.857	3 108 1	.404 .302	1.133 6	.267
Policies & Procedures are in place to ensure continuous improvements and support for technology replacement cycles	Between Groups Within Groups Total	.878 41.836 42.714	3 108 111	.293 .387	.755	.522

The greatest variation was shown in the area of the superintendent's perception of personal technology use as it enhances his/her professional practice and increases his/her productivity, with an F value of 6.736 and statistically significant at .000. The Crosstabulation (see Table 49) indicated of those 52 respondents or 46% who perceived this as important, 56% rated their efficacy level as proficient and 31% as expert. Only seven of these 52 respondents (13%) considered themselves a novice (2) or apprentice (5). Of the 59 respondents or 53% who perceived this as extremely important 31% rated their efficacy level as proficient and 68% as expert – 1% rated apprentice.

Table 49

CrossTab Efficacy Level/Personal Technology Use: Question 5

Personal Technology Use Enhances Professional Practice & Increases Individual Productivity * Efficacy Level in Use of Computers, Expert (4), Proficient, Apprentice, Novice (1) Crosstabulation

Count

		Efficacy Level in Use of Computers, Expert (4), Proficient, Apprentice, Novice (1)				
		Novice	Apprentice	Proficient	Expert	Total
Personal Technology Use Enhances Professional Practice & Increases Individual Productivity	Unimportant			1		1
	Important	2	5	29	16	52
	Extremely Important		1	18	40	59
Total		2	6	48	56	112

The next highest variation was indicated in the area of the superintendent's perception of whether or not new measures of student assessment and achievement are needed to reflect the impact of technology on student learning, the F value was 3.976 but still statistically significant at .010. The Crosstabulation (see Table 50) shows of the 78 respondents or 70% who indicated yes to this concept, 38 or 49% rated themselves proficient, 38 or 49% expert and 2 or 1% novice. The 23 respondents or 21% who indicated no to this concept rated themselves 7 proficient, 11 expert and 2 apprentice.

The remaining 9% of the respondents indicated no opinion to this concept.

Table 50

CrossTab Efficacy Level/Student Learning: Question 1

New measures of student assessment & achievement are needed to reflect impact of technology on student learning

. * Efficacy Level in Use of Computers, Expert (4), Proficient, Apprentice, Novice (1) Crosstabulation

Count

		Efficacy Level in Use of Computers, (4), Proficient, Apprentice,				
		Novice	Apprentice	Proficient	Expert	Total
New measures of student assessment achievement are needed to reflect impact of tech on student learning.	No		1	3	6	10
	No		5	7	11	23
	Yes	2		38	38	78
Total		2	6	48	55	11

The respondents' perception of technology providing an effective tool for the district leader to communicate and collaborate with the learning community showed a slightly lower variation with an F value of 3.651 but still statistically significant at .015. Crosstabulation (Table 51) shows that 57 or 51% of the respondents perceived this as important and 30 or 53% rated their efficacy level as proficient, 21 or 37% as expert and the remaining 6 or 10% as novice or apprentice. Of the 49 respondents or 44% who perceived this concept as extremely important 15 or 31% rated their efficacy level as proficient, 33 or 67% as expert and the remaining single respondent or 2% as apprentice. There were six respondents or approximately 4% who perceived using technology as a tool for communication and collaboration unimportant, in this category one rated his/her efficacy level as apprentice, three as proficient and two as expert.

Table 51

CrossTab Efficacy Level/Communications' Tool: Question 6

Technology Provides an effective Tool for the District Leader to Communicate & Collaborate with Learning Community. * Efficacy Level in Use of Computers, Expert (4), Proficient, Apprentice, Novice (1) Crosstabulation

Count

		Efficacy Level in Use of Computers, Expert (4), Proficient, Apprentice, Novice (1)				
		Novice	Apprentice	Proficient	Expert	Total
Technology Provides an effective Tool for the District Leader to Communicate & Collaborate with Learning Community.	Extremely Unimportant			2		2
	Unimportant		1	1	2	4
	Important	2	4	30	21	57
	Extremely Important		1	15	33	49
Total		2	6	48	56	112

In this chapter the data was analyzed using descriptive statistics including frequencies and percentages. An analysis of variance (ANOVA) was conducted for each of the research questions to identify the extent of the relationship between the independent variables (DFG, Learning Method, Personal Use/Modeling and Efficacy Level) and the dependent variables. The dependent variables had three overarching themes: Reorganizing the Culture of Learning – Understanding, Leading for Teaching and Learning – Modeling and Empowering, and Planning and Vision – Supporting. The next chapter will build upon these analyses to formulate a final summary, the conclusions and the recommendations.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Summary

The purpose of this study was to examine the technology leadership competencies for practicing superintendents in the state of New Jersey. This final chapter will present conclusions about the study and suggestions for future research. Additional thoughts about the study results will also be presented. As previously noted, the research questions in this study are:

1. Does the DFG of a school district significantly impact the perceptions of the superintendent toward technology implementation?
2. Does the superintendent's technology practice significantly impact the implementation of technology in his/her school district?
3. Does the superintendent's technology learning method significantly impact the implementation of technology in his/her school district?
4. Does the superintendent's self-reported level of technology efficacy significantly impact the implementation of technology in his/her school district?

A very small percentage of the respondents, 2.5%, indicated Other as the person who completed this survey. The review of the literature indicated a variety of titles assigned to technology leaders. An assumption can be made that the Other title may include

computer coordinator, department chair, educational technology coordinator and instructional technology director. Nine of the returned surveys did not indicate a District Factor Grouping category. An assumption can be made that the returned surveys without a DFG could be from superintendents in K-12 Special Service Districts since the State of New Jersey does not categorize these districts by DFG.

Conclusions of the Research

The first hypothesis of this study was that the District Factor Grouping, DFG, of a district would have a direct impact on the perceptions of the superintendent toward technology implementation. Conclusions that can be drawn from the self-reported data suggest this hypothesis is not true. Although, the evidence did indicate there were two statistically significant variations within the DFG grouping collectively the F value results were low ranging from .563 to 3.284. This 3.284 F value, the greatest significant finding, was within the theme of Reorganizing the Culture of Learning. While the majority of the responses (54%) indicated yes to the question - the Internet has created a new culture of learning shifting the control of information to students and families – 39% indicated no and approximately 7% had no opinion or a different opinion. Although the data did not indicate a clear trend between the DFGs, it did suggest 46% of the respondents still do not understand how technology is shifting the control of information and creating changes in the culture of learning. These results could be a reflection of the newness of the ever- changing dynamics and innovations triggered by technology, as identified in the literature review.

In "Empowering Students with Technology" Alan November lucidly cautions:

> The difficult work is reshaping the relationship between teachers and

> students. The real revolution in learning is not about adding technology on top of the current structure of schooling. Instead, the real revolution is about a transformational shift of control from the school system to the learners. (November, 2001 p. xv-xvi)

The district superintendents must not only be aware of this emerging shift, but they also must understand the implications this has on future planning and policy. Will the schools of the 21st Century incorporate more online learning and require less bricks and mortar? Will teachers still use textbooks or will information be found on the Internet - the new Information Highway?

The other statistically significant variation within the DFG analysis was in the realm of Leading for Teaching and Learning – Modeling and Empowering. The analysis of the results show that in all but one of the wealthier districts (DE, FG, GH, I and J) the respondents perceived encouraging professional staff to attend technology training, providing the release time necessary for the training along with the follow up support as extremely important rather than just important. However, this perception in the wealthier districts could be a factor of the availability of the school districts' resources, both financial and human. On the other hand, the results also indicated two respondents in GH districts did not even consider ongoing technology professional staff development as important. As indicated in the review of the literature, districts must couple technology infusion with ongoing staff training in order to gain positive impacts on student achievement (Valdez et al., 1999; Slowinski, 2000). Administrators must therefore provide the support, time and other resources teachers so desperately need to embrace technological reforms for effective student outcomes.

Furthermore, the emerging Technology Standards for School Administrators, (TSSA) that represent an initiative by the Collaborative for Technology Standards for School Administrators to develop and document a national consensus on what K-12 administrators should know about and be able to do to optimize the benefits of technology use in schools also posit that a leaders' vision, support, planning and modeling of best practices in technology implementation are key components for effective technology implementation. Yet the results of this study indicate over 40% of the respondents still do not perceive support for technology as important and this could suggest that ultimately the technology infusion and expenditures might not be effective in those districts.

The second hypothesis of this study was that the technology practice of the superintendent, that is his/her personal use, has a direct impact on the implementation of technology in his/her school district. There were several statically significant variations within this theme of Leading for Teaching and Learning – Modeling and Empowering. The preponderance of this statistically significant evidence suggests this hypothesis is true. In fact out of the ten statistically significant areas, there were six at the .000 level which indicate that these differences are quite rare outcomes, since SPSS truncates at $p <$ .0004 (Collins, 2001). Collectively, there appears to be strong correlation between the superintendents' technology practice and the technology implementation in his/her district.

Interestingly, the results indicate in those districts where the superintendent perceives technology initiatives are based on empirical and practical information to benefit students, 32 respondents model a great deal and 14 model some while only two model

little. On the other hand, the results show 21 respondents model a great deal and 33 model some while three model little in those districts reporting technology initiatives are not based on empirical and practical information to benefit students. Furthermore, a total of nine respondents had no opinion at all on whether or not technology initiatives are based on empirical and practical information to benefit students. One cannot help but ask what outcomes or expectations for increased student achievement might be anticipated from technology expenditures in these districts. Accountability is at stake here and the overarching policy question is simply whether or not there actually is a policy document such as a mission statement, curriculum framework, assessment system, building plan or some other plan that has been accepted by the district to provide a paradigm for technology implementation. But these results are no surprise, especially in light of the fact that technology expert Ian Jukes frequently depicts school district technology implementation practices with the slogan – ready fire aim!

Overall, the results indicated a relatively low number of respondents, seven or less, perceived any of the technology implementation concepts presented in this research study as unimportant. Furthermore, there is compelling evidence that those respondents who self reported modeling a great deal likewise considered the various technology concepts extremely important. For example, in using technology to enhance professional practice and increase individual productivity, 48 reported they model a great deal while 12 reported they model some and only one indicated little. At the same time, out of the 52 respondents who perceived this as only important, seven reported they model a great deal and 41 reported they model some. The remaining four respondents indicated they model little. The highest number of respondents who rated the use of technology as an effective

tool for communication and collaboration as extremely important also reported they model a great deal (39 out of 51). Eleven reported they model some and only one reported little. Likewise, of the 57 who rated this concept important, 16 reported they model a great deal, 38 reported they model some and only three indicated they model little.

Similarly, out of the 50 respondents who perceive assessing student and staff use of hardware and software and technology/curriculum integration for benchmarking and future planning of technology purchases and staff development as extremely important, 32 model a great deal and 17 model some while only one reported he/she models little. At the same time of the 58 who reported this concept as important, 20 reported they model a great deal, 35 reported they model some and the remaining three indicated they model little. This trend continues in the realm of encouraging staff to attend technology training on an ongoing basis, by providing release time and follow-up support. There are 36 respondents who model a great deal out of the 64 who perceived this concept as extremely important while only 17 of the 43 who perceived this concept as important reported modeling a great deal.

There is a noteworthy resemblance in the number of respondents who reported important versus extremely important in the realm of fostering and nurturing a culture of life-long learning to assure innovative technology practices for learning and teaching – 53 each. However, once more there is a higher incidence (34) of respondents who perceive this as extremely important and model a great deal as compared to only 20 who model a great deal and perceive this as important. The literature clearly identified the need for onsite hardware/software technicians and network administrators to provide necessary

technology support for faculty and staff. Of the 64 respondents who likewise perceive this concept as extremely important 41 reported they model a great deal while only 13 out of the 41 who perceive this as important reported they model a great deal.

Remarkably, the trend continues in the area of providing direction to integrate technology tools in productive teaching and learning by providing a building level instructional leader. Out of the 56 respondents who rated this concept as extremely important 37 reported they model a great deal while only 17 out of the 54 who perceive this concept as important model a great deal. Similarly, out of the 52 who perceive having policies and procedures in place to ensure continuous system improvements and support for technology replacement cycles as extremely important, 34 reported they model a great deal while only 20 out of the 55 who perceive this concept as important reported they model a great deal.

Interestingly and unfortunately, the one area that does not follow this trend is in the realm of who should be included in a district's technology planning committee. The literature embraces the concept of creating learning communities that include all stakeholders and sharing the power and shifting control of teaching and learning (Sergiovanni, 1996; Buchler & Johnson, 2002; November, 2001); however this evidence suggests that not only do 29 out of the 113 respondents do not even consider this concept important but out of this 29, 22 reported they model a great deal and only seven reported they model some while out of the 61 who perceive this concept as important 27 reported they model a great deal while 32 reported they model some. This evidence suggests while practicing superintendents may perceive technology planning committees as important they are still not ready to relinquish their control over decision making by

including a broad spectrum of stakeholders. However, there must be a paradigm shift away from this style of leadership, one of control, and movement towards one that espouses a leadership style that empowers others to effectively implement technology in education for maximum student benefit.

These results come as no surprise. The respondents' perceptions of their self-reported practice and policy in the realm of their districts' technology implementation support the existing body of research that illustrates modeling is an integral component of an authentic instructional leader. Furthermore, this compelling evidence reinforces the importance of the superintendent as the district leader for effective technology implementation. The literature review clearly indicates how technology must be supported and implemented to ensure changes in teaching and learning and ultimately improvement in student achievement. And intuitively, one can not help but ask how a leader can support and encourage his/her staff to operationalize the power of technology in teaching and learning without a personal knowledge base of what technology can and can not do.

The third hypothesis of this study was that the technology learning method of a superintendent has a direct impact on the implementation of technology in his/her school district. Clearly, the results of this study do not support this hypothesis. As evidenced by the extremely low F values, ranging from .172 – 1.662, the analysis did not indicate any statistically significant variations between the respondents' technology learning methods and the respondents' perceptions of the technology implementation concepts (the dependent variables). Collectively, the majority (61.4%) of the respondents indicated they learned technology either independently, self-taught, or they learned technology by

seeking collegial assistance as needed. One respondent (.9%) indicated his/her technology learning method was formal course work only, while 37.7% indicated two or more technology learning methods were used. Clearly these results indicate the majority of New Jersey's practicing superintendents have not received formal (classroom) technology training. As indicated in the literature review, technology is a quicksilver environment and difficult to encapsulate within well defined boundaries, higher education courses or licensure work. By the time curriculum might be approved and implemented changes in technology might warrant new conceptual approaches. Furthermore, books are frequently outdated by the time they are published and distributed to the learning communities. Additionally, these results could suggest current technology courses simply may not be available, convenient or attractive for practicing superintendents.

In fact, the literature review indicated the immense financial infusion (over $100 million) by the Bill and Melinda Gates Foundation to assist in the technology training of every superintendent and principal in our country. The New Jersey Educational Leadership Institute for Technology in Education (NJ ELITE) in partnership with the New Jersey Association for School Administrators (NJASA), New Jersey Department of Education (NJDOE) and the New Jersey Principals' and Supervisors' Association (NJPSA) currently initiated NJ ELITE training (NJDOE, 2001a). The format of NJ ELITE encourages collaboration and communication among participants by bringing the practicing administrators together at one of the fourteen sites within the State of New Jersey. The content of the first three sessions are referred to as the Core Days. The first session includes an overview of technology trends and their impact on developing a

vision for educational technology. Participants also receive materials that outline the expected competencies for school leaders and how they may be acquired, including the implementation of a staff development model to support the use of technology for student achievement. Core Day Two focuses on the role of technology in the learning process via curriculum design, assessment, and instructional strategies. Also covered in this session are identifying technology skills and proficiencies, understanding cultures and support systems to support educational technology and how the successful educational leader observes, evaluates and encourages technology use. In Core Day Three the participants examine components of successful school district's implementation of technology and incorporate all the core components into a plan of action that addresses learning environments, professional competency, system capacity, accountability and effective technology use by school leaders, teachers and students. These topics are all conceptual focus areas in this research study.

Institute 4 includes software and hardware instruction such as Outlook, Excel and PDA's, while Institute 5 focuses on effective instruction in a technology supported environment and Institute 6 identifies ways educational leaders can ensure technology professional development is taking place. NJ ELITE considers the aforementioned sessions the basics and has recently introduced Institute 7 – The Educational Leader as Communicator. This special topic Institute that is to take place February 20, 2002, will focus on how technology can enhance communication both within and outside a district's school. However, this particular Institute session is only being offered at one location in the entire State of New Jersey. This course content for NJ ELITE illustrates the significance and aligns with the findings of this research study. Why else would this

massive financial undertaking take place if it were not for the fact that the Exemplary Leadership Institute for Technology in Education for Superintendents and Principals realizes the importance of the leaders' role in the implementation of effective technology for student achievement.

The fourth hypothesis of this study was that the self-reported level of technology efficacy by the superintendent has a direct impact on the implementation of technology in his/her school district. Collectively these results are consistent with the aforementioned findings of this study and the literature. There is direct correlation between levels of technology proficiency and positive perceptions of personal technology use to enhance practice and increase productivity. The majority of the respondents (59 out of 112) perceived personal technology use as a tool to enhance professional practice and increase individual productivity as extremely important. Of this group of 59, 40 self-reported their efficacy level as expert and 18 self-reported their efficacy level as proficient while only one rated him/herself as an apprentice in the use of computers. Of the 52 respondents who perceive this concept as only important, 16 rated themselves as experts while 29 rated themselves in the lower category of proficient. These results support the trend reported in the previous results, that is the greater the use of the technology by the practicing superintendent, the higher the perceived level of importance reported for the technology implementation concepts.

The results for the perceptions of the respondents concerning technology as an effective tool for the district leader to communicate and collaborate with the learning community indicate a slightly different result. The majority of the respondents, 57 out of 112, perceive this concept as only important and in this group 21 self-rated their efficacy

level as expert while 30 indicated proficient with the remaining six indicating their level of efficacy is either apprentice or novice. However of the 49 respondents who viewed this as extremely important the overwhelming majority, 33 self-rated their efficacy level as expert and 15 self-reported proficient while only one respondent reported apprentice level. These findings align with the previous results of this research study. Furthermore, these results also indicate an alignment and a need for the emerging NJ ELITE Institute 7 focusing on how technology can enhance communication both within and outside a superintendent's school.

Furthermore, the majority of the respondents, 78 out of 111 indicated an awareness of the need for new measures of student assessment and achievement to reflect the impact of technology on student learning. Remarkably 38 self-rated themselves as expert users and 38 self-rated themselves as proficient while only two indicated they were at the novice level in the use of computers. However the evidence also suggests 33 respondents either do not understand the full impact of technology on learning or they simply had no opinion on this subject. Although these results provide interesting insight into the perceptions of the practicing superintendent and did indicate statistical significance, the majority of the concepts in this theme did not, therefore, the fourth hypothesis of this study - the superintendent's self-reported level of technology efficacy has a direct impact on the implementation of technology in his/her school district is not true.

Collectively this research indicates the superintendents' technology perceptions, practice, and understanding do play an integral role in the technology implementation of his/her district. In fact, the results illustrate that those superintendents who had stronger perceptions of the importance, that is viewed the concepts in this study as extremely

important, also had greater understanding of the power of technology as a communications tool, a motivating force in changing the culture of learning, and a powerful 21st century tool that must be supported with ongoing staff training, vision and planning to ultimately benefit students.

Recommendations for Future Research

The results of this study provide a snapshot of today's perceptions of the practicing superintendents in their role of technology leadership. The constant changes associated with the quicksilver environment of technology indicate that the results of this study may be relevant for only a short amount of time. Therefore in order to assure effective implementation of technology for student outcomes and be accountable for the billions of dollars spent on technology in America's schools, research will be needed on an ongoing basis. For example, current research indicates that wise staff development decisions are truly an integral component for effective technology implementation. New studies of the role the superintendent plays in influencing district professional development would provide valuable data and insight for future professional development policies and practice.

Furthermore, the literature clearly espouses the importance of ongoing professional development for teachers as a key component to ensure investments in educational technology positively impact student outcomes. And at the same time, the literature espouses that positive student outcomes in this 21st century incorporate the need for higher order thinking skills that, according to emerging research, are triggered and enhanced by the use of educational technology in teaching and learning. Thus, future

research should investigate the use of educational technology in professional development that focuses on the higher order thinking skills of the teachers as learners.

Since there were no existing standards in place for practicing superintendents when this research study began, the researcher created an original survey instrument using the themes or standards for teachers (International Society for Technology in Education, National Educational Technology Standards) along with concepts in the emerging Technology Standards for School Administrators and the concepts in various performance rubrics as defined in the literature. However, once the Technology Standards for School Administrators (TSSA) are in place future research should look at how the TSSA standards align with the results from this study. Longitudinal studies could either confirm or refute the findings of this study.

Future research in this educational arena should look at the characteristics of the practicing superintendents as the person who is the primary technology leader and how he/she influences technology implementation in his/her district. Since the results of this study indicated the majority of the respondents reported they learned technology on their own or self-directed, perhaps future superintendents should take the Self-Directed Learning Readiness Scale (SDLRS) instrument that identifies eight major factors that contribute to an individual's readiness for self-directed learning (Guglielmino & P.J., 1994). Furthermore, perhaps future superintendents should take one of the personality styles tests that measure the impact of personality styles on productivity – climate setting and styles of management as an effort to better understand their own process of decision making, interpersonal skills and/or intrapersonal skills which directly impact their

effectiveness as the district technology leader such as the McManus Personality Inventory (McManus, 1992).

As indicated in the New Jersey Education Association's February 2002 issue another venue for educational research in this area is the utilization of action research (DeBlieu, 2002). In this current issue, instructional staff is encouraged to engage in a more collaborative and interdisciplinary approach to improving teaching and learning. And, not surprisingly, technology is espoused as the primary tool, that is the integral component for increased student success. The current policy of encouraging districts, schools and individuals to model the best practices of effective technology implementation by their respective counterparts should be continued and evaluated on an ongoing basis through action research.

Again, effective technology implementation that ensures maximum student achievement requires an iterative and at the same time upward spiraling systems approach. Student outcomes and achievement will increase as new technologies emerge only if the educational leaders know how to make maximum use of these powerful ever-changing tools. Ongoing research should be conducted to provide a framework for the tenets of best practices for superintendents to model for effective technology implementation since this study demonstrated the significance of modeling by district superintendents.

The results of this study indicate the district superintendent should assess and evaluate their own personal perceptions and understanding of technology use prior to any new professional development undertaking to ensure the most effective results from the practitioners in his/her district. The quicksilver environment of technology leaves the

door wide opened for continuing research in technology's implementation and effectiveness. Coupled with its massive financial infusion and the trend for accountability educational leaders will be faced with ongoing stress and challenges for bottom line results in the use of technology.

Another area for future research is to investigate the influence of a district's size on the superintendents' perceptions and practice for the implementation of technology in their district. Perhaps a new study may identify evidence of special or different tensions and concerns large district superintendents experience and new findings may or may not align with the results of this study.

Future research should also continuously investigate the implications of how the use of educational technology is an intrinsic motivator for both students and teachers, and in fact practicing superintendents as evidenced in this study's results of the superintendents' learning method. As the literature clearly posits – learning will take place when a learner sees the relevance and importance of the subject matter. And since technology's quicksilver environment and ubiquitous emergence in all areas of life in this 21st century satisfy both of these learning components – all learners should be motivated by educational technology.

The State of New Jersey does have the data necessary to benchmark technology hardware availability and access within each district's Revised Technology Three Year Plan that was submitted as recently as July 1, 2001, however, what the State Department of Education does not know is just what technology leadership competencies including characteristics, styles and technical skills the practicing superintendents currently possess and how these factors influence their district's technology implementation. On the other

hand, New Jersey is currently collecting data for their 2002 School Technology Survey that was sent to every superintendent in the state and required completion prior to March 29, 2002. The questions in this survey include many of the themes in this research. In fact, one of the questions ask each respondent to rate the top ten areas perceived to be important for assisting in the implementation of educational technology. The ten areas to rate in importance include: planning, funding options, procurement, system networking professional development, support, curriculum integration, information systems, grant writing, skills and other. And since the role of the district superintendent as the technology leader is continually evolving due to the rapid changes in technology, research similar to this study should be conducted on a regular basis to determine if there are new trends or significant changes concerning technology leadership competencies and how they align with new cultures of teaching and learning created by these new technologies.

Finally, based on the evidence of the past twenty years, the future will continue to bring new technologies and changes in our culture that we have difficulty even conceptualizing. The rapid changes in computer chip architecture and innovative technologies surely will demand innovative visionaries to ensure appropriate and effective use of the educational technology that is truly the conduit for information and communication. One educational vision depicts a digital learning community with anytime, anywhere learning for all. Will there be traditional schools with bricks and mortar at the end of this century? Only time will tell, as our society responds to the innovative technologies that create new cultures of teaching and learning and at the same time demand new visionary leaders to implement them (Postman, 1992; Logan,2000).

Thus the real bottom line for educational technology is that research must remain iterative and forever upward spiraling to continuously effectively educate America's children.

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Appendices

Appendix A

Survey Instrument

Technology Implementation Practices and Perceptions
Superintendent's Questionnaire

Please do NOT put your name or any other identifying information on the survey

1. In your opinion, new measures of student assessment and achievement are needed to reflect the impact of technology on student learning.
   ___ Yes ___ No ___ No opinion
2. In your opinion, the Internet has created a new culture of learning shifting the control of information to students and families.
   ___ Yes ___ No ___ No opinion
3. In your opinion, technology initiatives are based on empirical and practical information about where and how technology can benefit students.
   ___ Yes ___ No ___ No opinion

4. In your opinion, technology use has created new basic skills: ***Please check all that apply.***
   ___ Computer Literacy (how to use a computer to be technically proficient)
   ___ Information Literacy (how to access and validate information and understand the organization of information)
   ___ Communications Literacy (how to interpret and understand the basic grammar/structure of an Internet address to establish new relationships)

   The following questions have 4 levels of importance: Extremely Important, Important, Unimportant, and Extremely Unimportant. *Please indicate you perception for each.*

5. As the district leader, personal technology use enhances professional practice and increases individual productivity.
__ Extremely Important __ Important __ Unimportant __ Extremely Unimportant

6. Technology provides an effective tool for the district leader to communicate and collaborate with his/her entire learning community.
__ Extremely Important __ Important __ Unimportant __ Extremely Unimportant

7. Technology audits are conducted prior to purchasing hardware and software for the district and/or site level.
__ Extremely Important __ Important __ Unimportant __ Extremely Unimportant

8. Technology funding is supported by regular, categorical and special-program budgets including partnerships and funding from outside sources.
__ Extremely Important __ Important __ Unimportant __ Extremely Unimportant

9. Schools in the districts assess student and staff use of hardware and software and technology/curriculum integration. Findings are used to refine the school plan for technology purchasing and staff development.
__ Extremely Important __ Important __ Unimportant __ Extremely Unimportant

10. A district technology committee includes the superintendent, teachers, students, businesses, and members of the community to create a district technology plan.
__ Extremely Important __ Important __ Unimportant __ Extremely Unimportant

11. Professional staff is encouraged to attend technology training on an ongoing basis, follow-up support exists, and release time is provided to the participants.
__ Extremely Important __ Important __ Unimportant __ Extremely Unimportant

12. Innovative technology practices for learning and teaching are assured by fostering and nurturing a culture of life-long learning by the professional staff.
__ Extremely Important __ Important __ Unimportant __ Extremely Unimportant

13. Technology support is provided to faculty and staff by building level hardware/software technicians and network administrators.
__ Extremely Important __ Important __ Unimportant __ Extremely Unimportant

14. Direction to integrate technology tools into productive teaching and learning is provided in each district building by an instructional leader.
__ Extremely Important __ Important __ Unimportant __ Extremely Unimportant

15. Policies and procedures are in places to ensure continuous system improvements and support for technology replacement cycles.
__ Extremely Important __ Important __ Unimportant __ Extremely Unimportant

16. As the district leader, effective technology use provides a model for other administrators, teachers and staff to emulate. Please indicate the category that best represents your self reported modeling.
__ A Great Deal __ Some __ A Little __ None

17. Please indicate the category that best represents your self reported efficacy level in the use of computers?
____ Expert Use as much as possible for professional or personal practice
____ Proficient Use 3-5 a week for professional or personal practice
____ Apprentice Use 1-2 a week for professional or personal practice
____ Novice Hardly ever use

18. Please select what best describes your definition of technology?
___ Equipment that performs any type of communication and/or presentation
___ Calculators, projectors, cameras, computer systems, and printers
___ Overhead projectors, cameras, computer systems, and printers
___ Other

19. Please indicate what best describes your acquisition of technology skills?
___ Self-taught (You determined what to learn as well as where and when)
___ Peer/collegial assistance (You obtained help on specific problems as needed)
___ Formal courses ***(Please indicate all that apply)***
    ___ Classroom (part of licensure course work)
    ___ Classes (you selected specifically)
        ___ (Classes taken online, via internet)
___ Other

20. Please indicate what best describes your perception of how technology funding should be implemented:
___ Permanent line item in district budget, grants, and/or business partnerships
___ Administrative/Board established amount for each building in the district
___ As funds become available
___ Other

21. Please indicate what best describes your perception of what triggers technology purchases:
___ Curriculum requirements
___ Necessity to use technology
___ Staff requests
___ Other

22. Please circle your district's Demographic Factor Group:
A B CD D DE FG GH I J

23. What is your district student population? _____

24. How many schools building are in your district? _____

25. How many professional staff members are in your district? _____

26. How many staff members does your district have in ***each*** of the following positions?

____ Curriculum support person for technology infusion
____ Technology Coordinator for district technology purchases
____ Network Administrator and/or network support person
____ Technology Technician for hardware/software support

27. This survey was competed by the:
___ Superintendent
___ Assistant Superintendent
___ Director of Technology
___ Other

28. Please provide any additional comments you may have concerning technology implementation practices and/or competencies in your role as district leader

Thank You

Appendix B

Solicitation Letters

SETON HALL UNIVERSITY
1 8 5 6

October 2001

Dear Superintendent:

I am a doctoral student in the College of Education and Human Services at Seton Hall University. My doctoral dissertation research explores the demands and dynamics of technology for you, as a K-12 district leader in New Jersey.

You have been randomly selected to participate in the pilot study. My research consists of asking all New Jersey K-12 Superintendents to complete the enclosed 28-question survey. Your participation in this pilot study will help to validate the construct validity and the reliability of the survey instrument. The findings of the research may help higher education to better prepare superintendents for the ever-changing technological demands. Your participation is completely voluntary and your anonymity will be protected. Data provided by you will be handled with the strictest of confidentiality, and stored in a locked cabinet that is accessible only to the researcher. The responses of all school districts will be combined in the presentation of the data. No individual superintendent will be identified in the study.

The enclosed survey should take you no more than 15 minutes to complete and I have enclosed a stamped return envelope for your convenience. ***Please do NOT put your name or any other identifying information on the survey.***

I would appreciate your completing the survey and returning it to me within the next two weeks. Your completion and return of the survey indicates your understanding of the project and your willingness to participate.

Upon your request, I will gladly provide you with the aggregated results of the completed study. I am available to address any questions you may have about the research or your district's rights as a research subject.

The project has been reviewed and approved by the Seton Hall University Institutional Review Board for Human Subject Research (IRB). The IRB believes that the research procedures adequately safeguard the subject's privacy, welfare, civil liberties, and rights. The Chairperson of the IRB may be reached through the Office of Grants and Research Services at 973-275-2974.

Thank you for your time and consideration in this matter.

Very truly yours,

Nancy Hudanich

Nancy Hudanich

APPROVED
OCT 17 2001
IRB
SETON HALL UNIVERSITY

College of Education and Human Services
Executive Ed.D. Program
Tel. 973.275.2728
400 South Orange Avenue • South Orange, New Jersey 07079-2685

SETON HALL UNIVERSITY
1 8 5 6

November 2001

Dear Superintendent:

I am a doctoral student in the College of Education and Human Services at Seton Hall University. My doctoral dissertation research explores the demands and dynamics of technology for you, as a K-12 district leader in New Jersey.

I am asking all New Jersey K-12 Superintendents to complete the enclosed 28-question survey. Your participation may help higher education to better prepare superintendents for the ever-changing technological demands. Your participation is completely voluntary and your anonymity will be protected. You may withdraw from the study at any time. Data provided by you will be handled with the strictest of confidentiality, and stored in a locked cabinet that is accessible only to the researcher. The responses of all school districts will be combined in the presentation of the data. No individual superintendent will be identified in the study.

The enclosed survey should take you no more than 15 minutes to complete and I have enclosed a stamped return envelope for your convenience. Please do not put your name or any other identifying information on the survey.

I would appreciate your completing the survey and returning it to me within the next three weeks. Your completion and return of the survey indicates your understanding of the project and your willingness to participate.

Upon your request, I will gladly provide you with the aggregated results of the completed study. I am available to address any questions you may have about the research or your district's rights as a research subject.

The project has been reviewed and approved by the Seton Hall University Institutional Review Board for Human Subject Research (IRB). The IRB believes that the research procedures adequately safeguard the subject's privacy, welfare, civil liberties, and rights. The Chairperson of the IRB may be reached through the Office of Grants and Research Services at 973-275-2974.

Thank you for your time and consideration in this matter.

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